THIS WEEK IN THE
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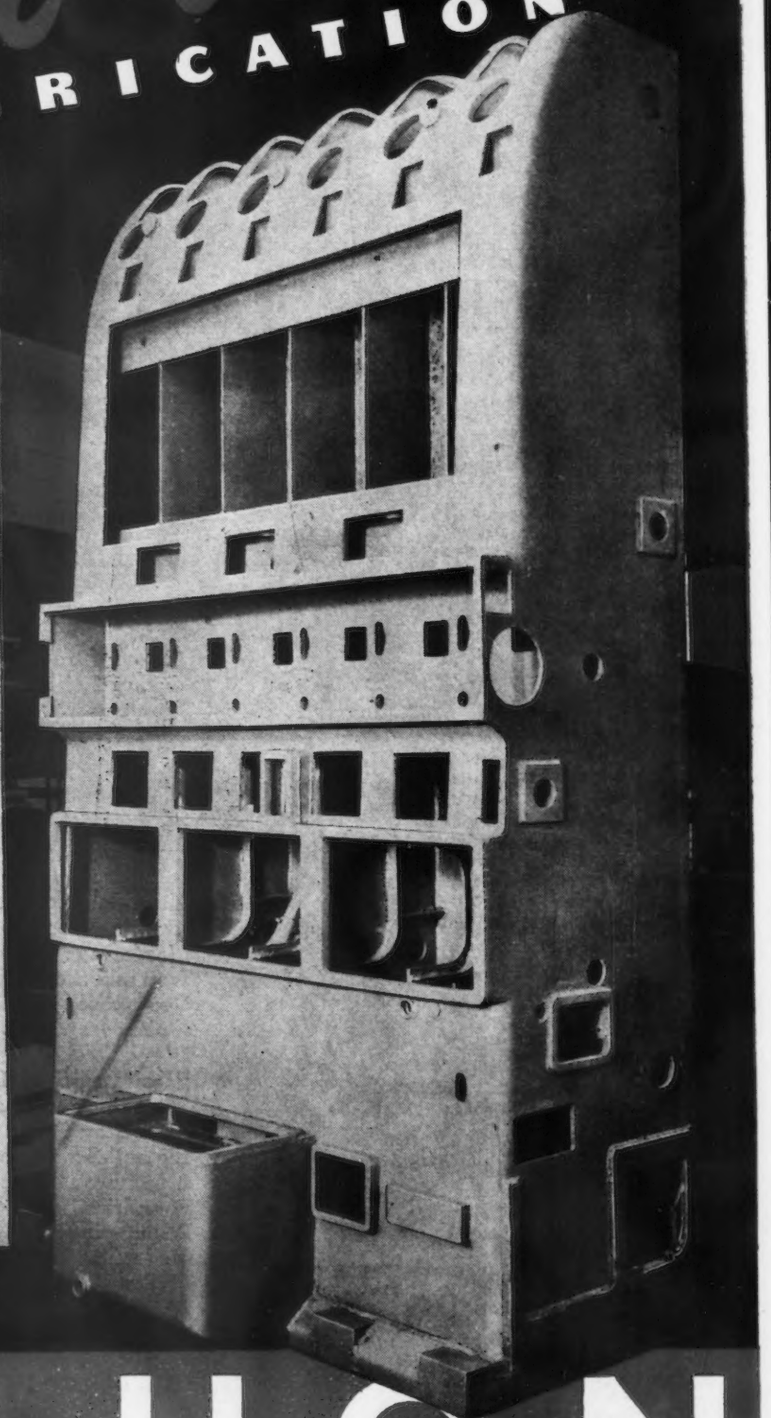

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The Tail Chasing Cat

YOU have heard the expression, "going around in circles," but if you want a good example of it, watch a kitten chase its tail. Only young cats are foolish enough to indulge in this pastime. A mature cat is sensible enough to know that there is no percentage in it and that the tail is bound to move just as fast as the rest of it does.

An old cat appreciates the laws of physics even though he or she has not had a college education. It is sensible enough to appreciate the fact that two things inextricably fastened together must move, forward or backward, at the same rate unless both are stationary which they seldom are.

So it is with wages and prices. Wages form the larger part of the cat; his tail is the price tag. Where the cat goes the tail will follow. The cat can't get ahead of it.

This ought to be clearly evident by now to every worker and every industrial manager. So far as I have been able to ascertain, and I have made every effort to do so, there has not been a strike in any major industry which has left the workers who participated in it one cent better off in weekly take-home purchasing power. And I doubt if there ever will be while the cat chases its tail.

Wage rises that amount to anything other than paper figures must come from increased productivity per hour and per man. There is no other way to get it. Increased profits and dividends come from the same source. Then they are real increases in purchasing power and not just paper mark-ups.

A large percentage of our important industries are now in the red, or approaching it, in spite of whatever price relief has been afforded. While the wage mark-ups have helped to put them there, this is not the most serious factor. The damaging fact is that you cannot get blood out of turnips, nor can you get full payrolls from closed or half-closed plants; whether they be closed because of strikes, slowdowns, supplier strikes or whatever. Neither can you get profits.

So the cat is chasing its tail, not merely in circles but in an ascending spiral that makes the poor consumer, who stays on the ground floor, dizzy each time he pulls out his pocketbook.

Every time the cat makes another round, with his tail following after him, the value of annuities, of savings in banks, of war and other bonds and of fixed white-collar salaries takes another nose dive.

Management and labor are not alone to blame for this epidemic of tail chasing. Government has a great deal to do with it. We have been devaluing the American dollar for the past ten years without a stop, whereas Canada has increased the value of its dollar within the last few weeks. If we do not stop this silly and dangerous pastime we shall soon price ourselves out of the world market.

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► Imports of high grade iron powder from Sweden to be marketed at a significantly low price are expected to expand the commercial possibilities of manufacturing parts by means of powder metallurgy.

► The aluminum foil industry foresees a significant expansion of uses of its products and is working experimentally on a number of new developments. Aluminum's thermal conductivity is such as to promote its use for packaging quick frozen foods.

► An observer of the Bikini tests, Prof. M. Oliphant of London, estimates that 200 atom bombs could wipe out Britain, whereas it would take 1000 or 2000 to cripple Russia or the United States. At the new price of $1 million per bomb the entire civilized world could be destroyed for far less than $70 billion which the United States spent in fighting World War II.

► Army aircraft produced during the past fiscal year had an average airframe weight of 15,175 lb and an average cost of $290,428. This gives a cost per pound of $19.16. Airplanes to be procured during the current fiscal year have an average airframe weight of 11,371 lb and an average cost of $276,008. This gives a cost per pound of $24.27, or a 26-pct increase per pound.

Gen. Carl Spaatz, AAF chief, attributes 60 pct of the increased cost to higher labor costs (direct and indirect) and 40 pct to higher material prices.

► Approximately 72 new Army utility vehicles will be turned out during the next 12 months. Dubbed the M-44, this new model is a fully tracked vehicle which is supposed to replace the half-track. It is to be used to carry anything that goes under fire, including ammunition and personnel, with a maximum amount of protection from gunfire.

► The service life of pots for melting and casting light metal alloys has been increased from 4 to 5 days to several weeks by coating them with porcelain enamel.

► Iron-copper powder compacts sintered in atmosphere-controlled furnaces at temperatures of about 2010°F exhibit properties far superior to those obtained with pure iron under the same conditions. Wetting and alloying action of copper with iron upon melting are responsible for these improved physical properties.

For example: 10 pct Cu-Fe mixtures sintered for 10 min at 2190°F possess a greater tensile strength than can be attained by sintering pure iron at any temperature for any length of time. Tests on mixtures of 5 to 30 pct Cu-Fe, however, seem to indicate that there is little to be gained in strength by using greater quantities of copper.

► Now in the development stage for the welding of titanium-stabilized 18-8, a high temperature alloy, are titanium-bearing electrodes that will not readily oxidize. Normal titanium rods lose too much titanium through oxidation to provide immunity from intergranular attack in the weld bead.

► Not to be outdone by Army announcement of the flight of 3 B-17 drones from Hawaii to the mainland, the Navy announces that it has in "immediate prospect" pilotless aircraft capable of carrying atomic bombs. These craft would have speeds up to several thousands of miles an hour.

► Boeing Aircraft is reported to be ready to test fire 60 supersonic test missiles said to be designed to destroy enemy aircraft or other missiles.

► According to a recent ICC decision railroads are not required to furnish spotting service within large plant areas with extensive trackage.

► The peak of government removal of machine tools and production equipment from surplus war plants was reached early this year and is now on the decline, with clearance of the larger plants virtually complete. $500 million worth was taken from 98 war plants during the first quarter against $150 million from 84 plants in the second quarter of 1946.

► OPA refusal to grant a further increase in pig iron prices indicates that future relief will have to come by specific application from marginal producers. The New England Foundrymen's Assn. is pushing CPA to reopen the Mystic furnace. The answer reportedly hinges largely on the question of subsidy.

► Floyd O. DeMillar, head of the Newport (R.I.) Research Foundation has developed a machine which strips electrical wire ranging from 1/16-in. diam at the rate of 100 fpm. It measures but 6x6x4 in.

► Krupp engineers used a high pressure sintering process involving use of resistance heated precision graphite molds. The company had succeeded in producing rings for deep-drawing steel cartridge cases up to 220 mm OD and 150 mm ID. The rings were pure tungsten carbide with 15 pct cobalt binder.

► Uranium, source of energy for the atomic bomb, was formerly used to make a complete range of green dyes for the porcelain enameling industry. Because of its scarcity, enamelers have been forced to devote considerable research to find satisfactory substitutes.

Upsetting Tubular Members Simplified

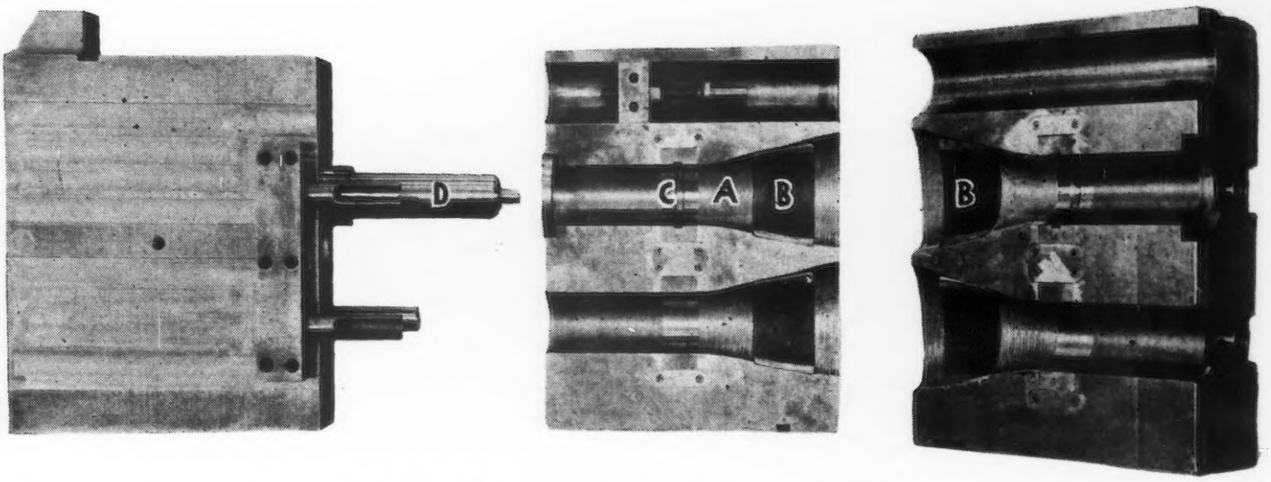


FIG. 1—Upsetting die with cavity, A, arranged for cuff ring forming. Also shown is an etched cross-section (extreme right) of a finished shank indicating the amount of material upset in a single stroke of the press. This amounts to about three times the original wall thickness.

UPSETTING the shank of steel propeller blades in order to provide additional stock in the ID for forming the necessary shoulders and threads, presents a serious problem in holding. These blades are fabricated from two tapered sheets of alloy steel, ½ in. thick at the butt end* and welded together on both the inside and the outside. In order to hold the blade during the upsetting operation, a steel ring was welded around the outside at a fixed distance from the end.

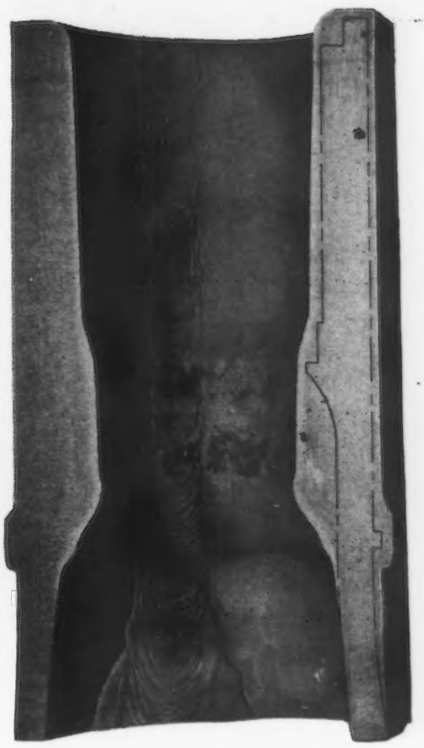
* *"Forming Heavy Plate With Kirksite Dies,"* THE IRON AGE, *Mar.* 14, 1946.

The welding of this ring, known as the cuff ring, created several objections, even though automatic, submerged melt welding was used, for the reason that some of the welded rings retained defects such as slag inclusions, blowholes, or cracks in the finished blades. Furthermore, the welding operation added considerably to the cost of manufacturing, as several other operations were necessary in order to reduce the percentage of scrap. These included heat swaging and cooling the cuff area, shot blasting, stress relieving, and rough machining preparatory to upsetting. Even with all these precautionary operations, more than 7 pct of the blades were scrapped due to defective cuff ring welding.

To overcome this it was decided to form the ring by an upsetting process, but in order to do this it was necessary to find some method of holding the blade at a distance sufficiently removed from the heated area that the gripped portion would not collapse. A pair of serrated jaws was therefore inserted into the upsetting die and shaped to conform to the contour of the flattened portion of the blade. The serrations were made V shaped to a depth of approximately 0.0015 in., and were produced during the Kellering operation necessary to form the jaw contour. The jaws themselves were hardened to 60 to 62 Rc and not anchored rigidly, but were given a small amount of float, and were made sufficiently thick that they would not distort during heat treating and could be

FIG. 2—Shank end of propeller blade with cuff ring formed from parent metal.

By Special Grippers



Upsetting parts of tubular section with relatively thin walls, such as the shanks of aircraft steel propeller blades, presents an extremely difficult problem in avoiding collapse at the gripping area. A method successfully applied and patented by Curtiss Wright Corp., is described herein, which permits simultaneous upsetting of the ID and the cuff ring with one stroke displacing up to 45 cu in. of metal. A special cooler designed to prevent the spread of heat from the upsetting to the gripping area is also discussed.

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By LAMBERT R. PISTOLES
Paterson, N. J.

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reground and shimmed several times before being discarded.

Fig. 1 shows the upsetting die as arranged for cuff ring forming. Note that only cavity A was used for this purpose, as only one stroke of the press was necessary. B shows the serrated floating jaws, C is the ring forming inserts, and D the ring forming punch. The etched cross-section of a finished shank, fig. 1, indicates the resultant flow lines.

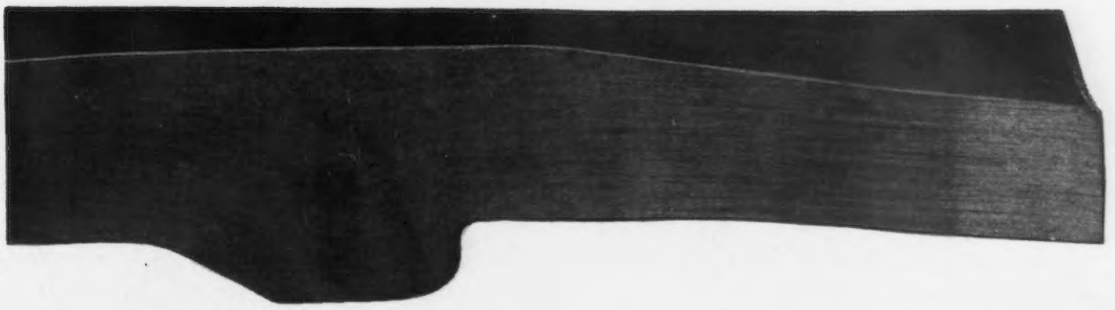
The cuff ring serves a dual purpose (1) for retention of the cuff itself in the complete assembly of the propeller, and (2) as a butting shoulder when upsetting the ID of the shank. When formed from the parent metal, the physical properties are increased, and rough machining operations preparatory to upsetting are not necessary, since end relation and size of the ring are easily controlled. See figs. 2 and 3.

The blade shanks are heated by induction heating coils as shown at fig. 4. The heater is designed to heat a strip 1¼ in. wide to a temperature of 2100°F, and the remainder of the shank to 1200°F. It is used with a standard Tocco induction heating machine, and has a heating cycle of 2½ min, using a maximum of 95 kw. The coil is formed of ¼ x ½ in. rectangular copper tubing, using seven closely spaced coils at the ring area completely taped with glass fabric, and nine widely spaced coils for the remainder of its length.

By making the serrated jaws shown at B in fig. 1 pinch the blades slightly harder, production tests showed that with the blades currently in production it was possible to resist the upsetting load when upsetting the ID of the shank and, further, that it was possible to resist the combined upsetting load of the ID and cuff ring. It was therefore entirely practicable to perform both operations simultaneously with a single stroke of the press, displacing a total of 33 cu in. of metal.

Several different types of blades, however, are manufactured, and still others planned for the future, and with the advent of the gas turbine and its freedom

FIG. 3—Cross-section of cuff ring formed from parent metal and hot etched to show excellent flow lines obtained.



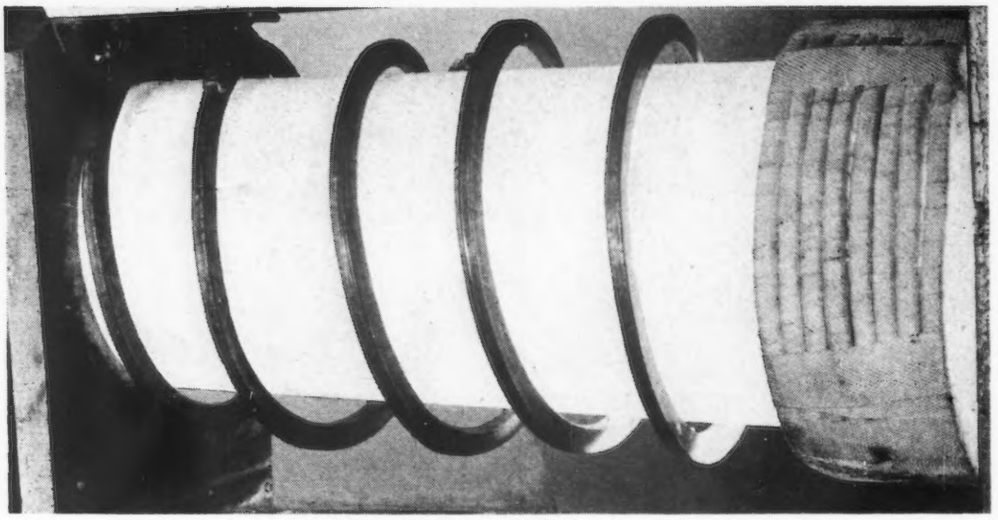


FIG. 4—Induction heating coil used for heating blade shanks prior to ring forming.

from vibration, blades may be made of substantially lighter material. These will undoubtedly require some support under the gripping area, as also will those which do not require a cuff ring, or whose cuff ring is so close to the upsetting heating area that it may attain a temperature of 1500°F. In such cases the ring, when used for butting purposes, would be unable to resist the upsetting load.

It was decided, therefore, to develop a method whereby a greater upsetting load could be resisted by gripping at some distance from the heated area, but at the same time avoid collapsing the blade when this was of thin wall construction. For this purpose a special split wedge was designed for insertion into the blade prior to heating and gripping. The wedge consists of a pair of wedge-shaped shoes, shaped on the outside to conform to the contour of the inside of the blade, flat on their inner faces, and keyed with sliding ways to a taper block located between them. The assembly is inserted into a blade by means of a loading tool, as shown in fig. 5, using stops to assure proper location. The center wedge is then driven tightly into place to create a preload and to bring the width of the blade to the desired size. To remove the wedge, a rod is screwed to an extension on the center wedge and a drift is driven into a slot in this rod as shown in fig. 6.

During the upsetting operation, an auxiliary spring-loaded punch located inside the main punch, bears on the end of the center wedge to maintain pressure and avoid slipping when the inside angle of the blade is more than 7°.

Fig. 7 shows a blade upset with one stroke of the press. The outside shows that a slight slippage took

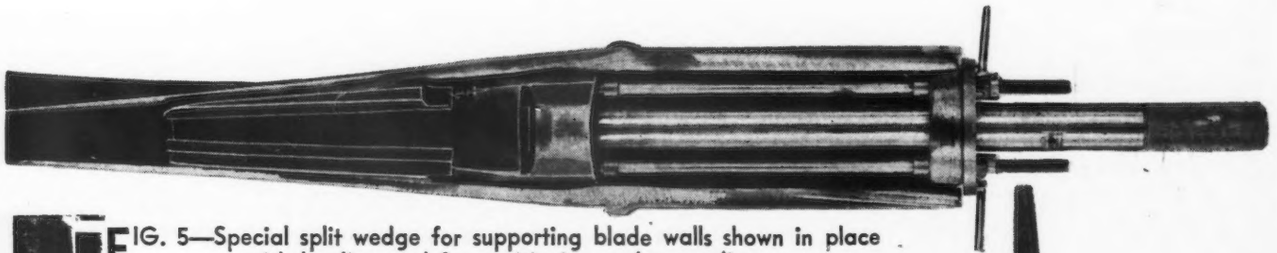


FIG. 5—Special split wedge for supporting blade walls shown in place with loading tool for positioning and expanding.

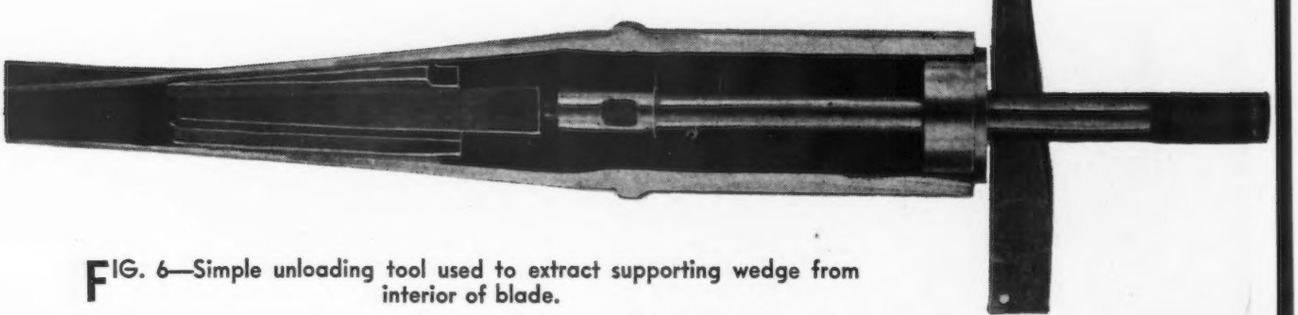


FIG. 6—Simple unloading tool used to extract supporting wedge from interior of blade.

FIG. 7—Shank upset using the split wedge method. Gripping marks on the blade portion are very shallow and will be removed by grinding.

place until the blade was finally jammed between the jaws. This slippage can readily be controlled so as not to exceed 1/16 in. A pickup is also visible on the outside of the blade, but this does not exceed a depth of 0.005 in., corresponding to the 0.005 in. depth of the jaw serrations. These marks are of no consequence, since as much as 0.020 in. is later ground off the shank at this area.

Fig. 8 shows a complete cross-section of the die which functions in the following manner: The shank end of the blade is heated to 2100°F in the induction heating coil, and loaded into the die. As the die closes, the ram carrying the punch moves forward, compressing the heavy die springs D by means of the plungers E. This forces the wedge F forward to engage the spherical plunger G which in turn forces the jaws to engage the blade and apply a pressure of about 50,000 lb before the punch B comes in contact with the end of the blade shank. As the punch continues its forward stroke it tends to jam the blade between the jaws C, thus creating a back pressure which in turn locks the wedge F in position, since this has only a 2½° angle. The blade is thus prevented from moving forward.

When the stroke is completed and the punch travels backward, the springs D follow the plungers E, but the wedge F remains locked until, at the full open position, the buttons H are engaged by the stops on the plungers, and the wedges are released.

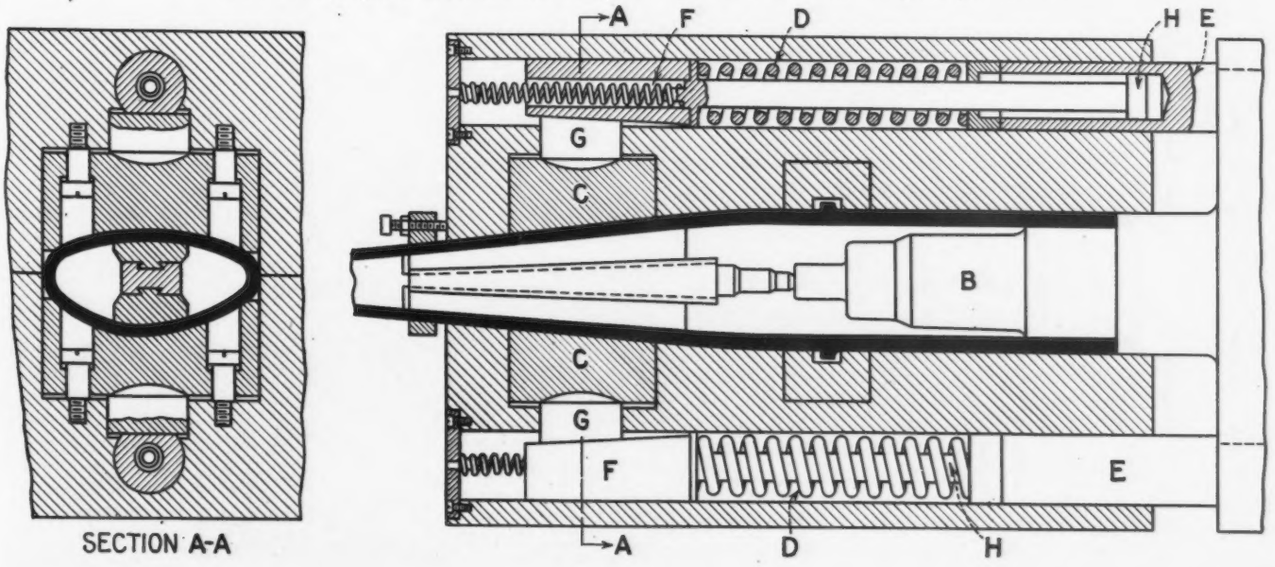
Immediately after upsetting the blade shanks are submerged in mica for a period of slow cooling.

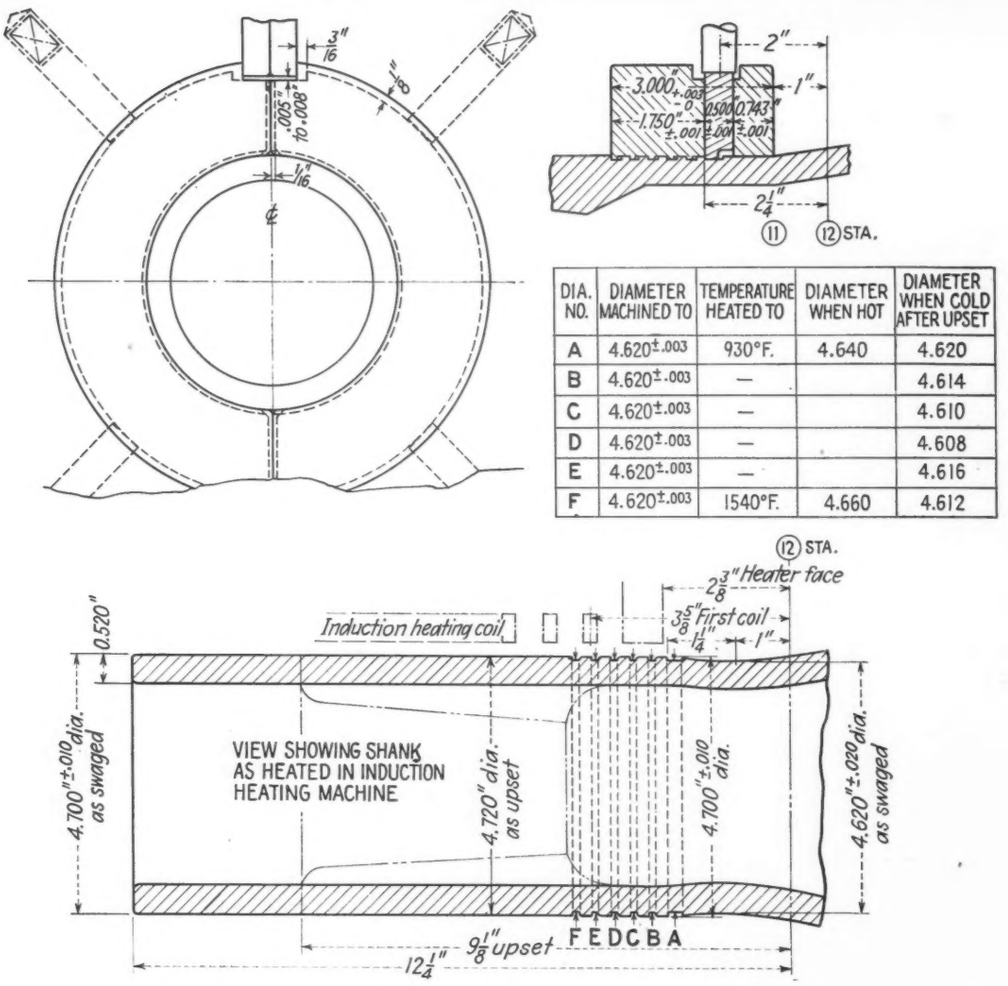
In cases where the cuff ring is not required, it is necessary to obtain sufficient gripping area on the round portion of the shank beyond the upsetting area. For this purpose a grooved ring gripping method has been developed in which a series of 6 grooves 0.040-in. deep is machined around the periphery of the shank, and these are gripped by grooved ring inserts as shown in fig. 9. Experiments were conducted with a view to forming these grooves in a die, but it was found that better accuracy could be maintained by machining, and there was little or no cost advantage.

The inserts are located in a recessed portion of the die, as shown in fig. 1 at C. The locating insert shown in the large groove of fig. 9 is actuated by two die spring plungers on each half of the insert, the inserts being retained in the die by means of plates. These locating inserts are free to move outwards about ¼-in. when the die opens, thus making the locating operation comparatively easy. When the die is closed the locating insert will maintain a constant pressure on the bottom of the groove, thus giving maximum shoulder contact and aiding in resisting the upsetting load.

The portion of the insert containing five circular teeth is stationary, and is so designed that the teeth contact both top and bottom of the grooves in the shank and pinch about 0.010-in. on the diameter at

FIG. 8—Complete cross-section of upsetting die with blade in upset position.





DIA. NO.	DIAMETER MACHINED TO	TEMPERATURE HEATED TO	DIAMETER WHEN HOT	DIAMETER WHEN COLD AFTER UPSET
A	$4.620^{\pm.003}$	930°F.	4.640	4.620
B	$4.620^{\pm.003}$	—		4.614
C	$4.620^{\pm.003}$	—		4.610
D	$4.620^{\pm.003}$	—		4.608
E	$4.620^{\pm.003}$	—		4.616
F	$4.620^{\pm.003}$	1540°F.	4.660	4.612

FIG. 9—Details of ring-type gripping jaws showing locating inserts in wide groove, backed up by springs and plungers.

upsetting temperatures. This avoids any clearances into which the metal might be upset.

Temperatures at the gripping area ranged from 700° to 1700°F and upsetting actually took place in the area directly under the first two grooves. The shank is so gripped, however, that the only alternative would be for the metal to shear at the bottom of the grooves in the shank, as the inserts themselves are made from hot die steel heat treated to 53 to 56 Rc, and are therefore more resistant to shear that the shank at its heated condition.

Excellent results were obtained by this method of holding, and it was possible to upset the ID of the shank with a single stroke of the press, displacing 30 to 45 cu in. of metal depending on the size of the shank. Fig. 10 shows a blade shank upset by this method.

While the grooved ring method proved to be very successful, and satisfactory for shanks with thin walls, it was decided to develop a faster method whereby it would not be necessary to cut any grooves in shanks with thicker walls. It was hoped that this could be accomplished with serrated inserts shown in fig. 11. These were designed so that the teeth would penetrate 0.005 to 0.010 in. with the least possible resistance, and the contact area was made lighter at the center and heavier at the sides. Also, a greater number of teeth was supplied at the rear or colder area. The teeth were made from high chromium or tungsten steel to resist the high temperatures involved, as shown in table I.

In spite of these precautions, however, the shanks collapsed due to excessive heat at the gripping area. Temperatures in this area ranged from 1700°F at the

FIG. 10—Blade shank with ID upset by use of the grooved insert gripping method.

upset side of the inserts to 700°F at the other side, 3 in. away. To overcome this condition, an ingenious cooler was devised. This consists of three sections of copper coils, each with a separate water inlet and outlet, arranged around the inner circumference of a spring clamp. These coils are actuated by a hand clamp at the top of the cooler, thus bringing them into close contact with the shank during the heating cycle. For production use, however, the clamp can be replaced by a slow-operating solenoid connected with the starting switch of the induction heating machine, thus making the operation automatic. The general arrangement of this cooler is shown in fig. 12.

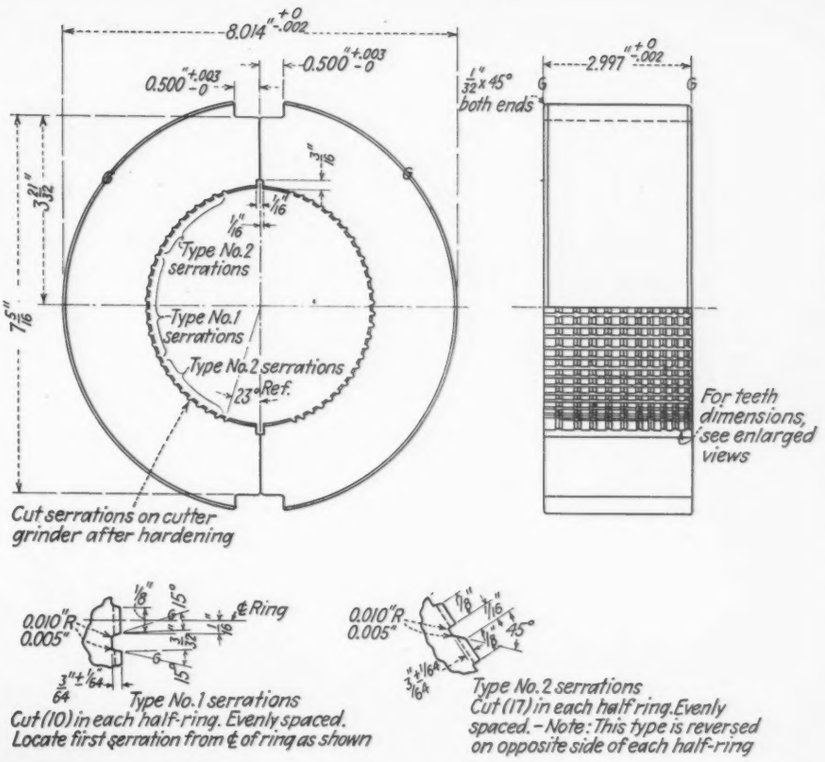
An air-operated cooler has also been devised, consisting of a hollow ring having a series of small holes drilled through its inner face as shown in fig. 13. These

ABOVE

FIG. 12—Water type shank cooler for preventing the upsetting heat from spreading to the gripping area.

o o o

holes are 1/32 in. diam, and increase in number towards the hot end of the shank. The last row of holes is drilled at a 45° angle to direct the air flow outwards. Two air inlets are provided, and the supply may be controlled either manually, or through a solenoid. While satisfactory as a cooler, however, it has the disadvantage of



0.010"R 0.005"
℄ Ring
15°
Type No.1 serrations
Cut (10) in each half-ring. Evenly spaced.
Locate first serration from ℄ of ring as shown
0.010"R 0.005"
45°
Type No.2 serrations
Cut (17) in each half ring. Evenly spaced. - Note: This type is reversed on opposite side of each half-ring

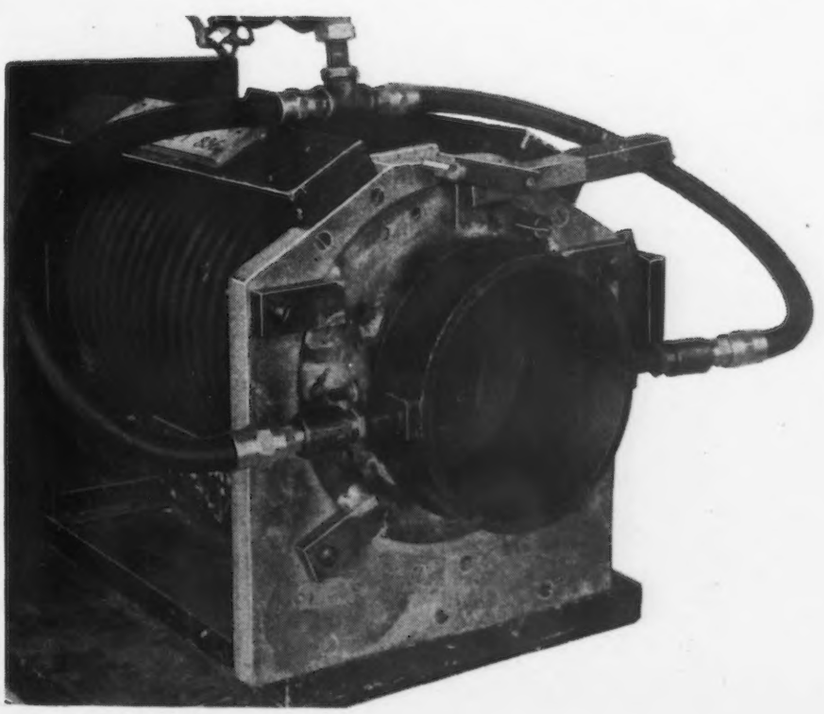
ABOVE

FIG. 11—Details of serrated type gripping jaws. Close adherence to the dimensions given is essential for prevention of collapse of the shank.

o o o

BELOW

FIG. 13—Air-type shank cooler which serves the same purpose as that shown in fig. 14, but has certain objectionable features.



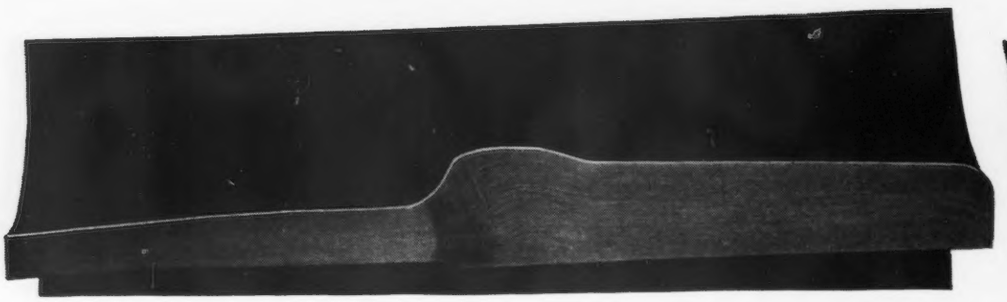


FIG. 14—Hot etched cross-section of shank upset with localized heating and serrated gripping inserts.

FIG. 15—Outside view of shank shown in fig. 14. Marks made by serrated gripping inserts are clearly visible, but will be ground out in later finishing operations.

TABLE I

First and Second Choice of Steels to Be Used for Die Rings

First Choice Carpenter Hampden Steel		Second Choice Carpenter Star Zenith Steel	
Carbon	2.10	Carbon	0.72
Manganese	0.75	Manganese	0.25
Silicon	0.25	Silicon	0.20
Chromium	12.50	Chromium	3.75
Nickel	0.50	Tungsten	18.25
		Vanadium	1.15
Oil harden and draw to 61 to 63 Rc		Oil harden and draw to 61 to 63 Rc	

Note: Use second choice only if first choice fails by softening. No. 610 Carpenter air-hardening steel may be used in place of Hampden steel.

creating strong drafts of heated air toward the operator unless shut off before removing the blade from the heating coil.

Using the localized heating and the serrated jaws described above, excellent upset shanks were produced in a single stroke of the press. One of these is shown in fig. 14 in cross-section, where the heat dividing line is clearly indicated by the change in color. It will be noted that upsetting occurs directly underneath the gripping area, and that excellent flow lines are visible. The external appearance of one of these blades is shown in fig. 15.

The entire process has been patented by the Curtiss Wright Corp., and while designed primarily for the upsetting of propeller blade shanks, would seem to offer an interesting method of holding any round or irregularly shaped part during an upsetting operation, particularly where relatively light cross-sections are involved.

Tailor-Made Boiler Tubing

USE of the oxy-acetylene pressure-welding process, has enabled one manufacturer to make "tailor-made" boiler tubing of any desired length from standard tube stock. The tube lengths to be welded are clamped in the machine and subjected to hydraulic pressure and heat supplied from a special ring-type oxy-acetylene heating head, according to Linde Air Products Co., New York. In a short time plastic upsetting of the butted edges is said to occur, producing a weld of high quality. The accompanying photograph shows this welding operation being performed on two lengths of boiler tubing.

Aging Heat Treatments of 75S Aluminum

IN view of the variety of precipitation heat treatments of Al-Cu-Zn alloys, F. R. Kostoch, North American Aviation, Inc., Los Angeles, presented a paper on the three classes of aging treatments of Alcoa 75S and the apparent advantages of each, at a recent panel discussion of the ASME Aviation Section. Solution heat treatment is similar to that for other high strength aluminum alloys and consists of heating in a specific temperature range followed by a cold water quench, the author stated. For Alcoa 75S the temperature is 860° to 930°F (R-303 temperature is 810° to 840°F).

The aging treatments fall into three classes, continuous, interrupted, and progressive. As the name implies, continuous aging consists of heating at a constant temperature for a determined time. One such treatment is 23 hr at 250°F. Higher temperatures and shorter times have been tried but these generally result in lowered tensile strengths for the "T" temper.

Interrupted aging is defined as heating at two or more elevated temperatures with a cooling to room temperature after each time at temperature. An example of a currently used interrupted aging is 4 hours at 210°F, cooling to room temperature, then aging at 315°F for 8 hr. The rate of cooling to room temperature does not affect the "T" temper properties and the time between the elevated temperature heating has no appreciable affect.

Progressive aging is a cyclic treatment where progressively higher temperatures are employed. No cooling between temperatures is used. One such treatment is similar to that mentioned for interrupted aging omitting the intermediate cooling, i.e., 4 hr at 210°F and then 8 hr at 315°F.

Selection of a short aging cycle has not been a matter of simple choice. Numerous tests showed that slightly higher tensile properties could be attained in as-fabricated material by the continuous process but after sufficient data had been accumulated it was shown that the differences were so small that the same minimum specified properties could be applied to material aged in any of the three manners.

Coldworking in the solution treated but unaged condition also has a measurable effect on the physical properties of the final "T" temper. A reduction of 3 pct in thickness prior to continuous aging will cause a slight decrease in tensile yield but larger percentages of reduction generally result in an increase.

Interrupted aging of material which has been cold worked in the "W" temper results in lower tensile properties in ratio to the amount of deformation. The average loss in ultimate and yield is 1000 psi for each percent of permanent set. Progressive aging has an effect comparable to that for interrupted aging.

Continuous aging is recommended for extruded products and rolled bar because these generally are stressed to high degree.

Increased dimpling capacity is one of the marked advantages obtained from use of the interrupted or progressive aging. Further, cold working in the "W" temper regardless of the aging treatment produces a superior dimpling capacity. Because dimpling may be very important in fabrication all sheet currently produced is being aged by the interrupted process.

Corrosion resistance of 75ST aged by any of the three processes are at least equal and the interrupted or progressive aging may produce slightly superior resistance.

The selection of the most desirable aging treatment for a particular manufacturing division may be evaluated on the following criteria; (1) the form of material being processed, (2) the cost including furnace time for the process, (3) the fabrication methods used, (4) the adaptability of the process to the work schedule, and (5) the physical properties required in the finished product.

Evaluating each factor, continuous aging is most satisfactory for extrusions or rolled bar products because these are generally stressed to a high degree and highest physical properties obtainable are desired. For sheet stock which is generally fabricated in the "W" or "T" temper continuous aging will give highest tensile strengths but parts of this nature are usually unstable in design under other than the limit tensile loads and the shorter discontinuous treatments will provide sufficient strengths. The latter treatment will produce better dimpling characteristics and this may be a marked advantage.

The cost of furnace time is an item for individual estimation of each plant. If furnaces are available the interrupted process may be best as one furnace can be held at 210°F and another at 315°F. Transfer can then be made without changing furnace temperatures. If only one furnace is used the raising and lowering of the temperature may be costly.

The work schedule of a particular plant should be considered also. If an 8-hr day is the rule then the 23-hr schedule may be most practical because it may be loaded at any hour during the shift and removed the following day. If more than one shift is used then the discontinuous processes may be better.

Because 75ST is an age hardening alloy it is necessary that some means of identifying the "W" from the "T" condition be established. 75S is used in every form except castings, so it is not difficult to foresee mixing of stocks of material.

The hardness ranges of the "W" and "T" tempers overlap and hardness testing becomes unreliable. In an attempt to find a macro-etch which would be suitable for production inspection use an interesting laboratory procedure has been developed. This laboratory method is not infallible but appears to offer possibilities.

A $CuCl_2$-NaOH etchant is used and the material develops distinctive color patterns in the "W" and "T" tempers. Sheet stock appears to develop the most distinct difference in color pattern, but small size extrusions may closely approximate sheet stock in results. Material from the center of large cross-section extrusions often fails to give a good differentiation. The probable reason is thought to be the presence of residual cast structure resulting from insufficient working of the center material.

This identification test unfortunately does not differentiate quality of heat treatment and therefore cannot be used as an inspection tool for this purpose.

Die Casting

FIG. 1—One of the Lester-Phoenix machines used for casting outboard motor parts. At the right is one of the Ajax holding furnaces.

ONE of the most modern aluminum die casting plants in the country is the Johnson Motors plant at Waukegan, Ill. Few plants have as many machines, or as many modern units, used exclusively for producing aluminum die castings, as this plant. In no other die casting installation of comparable size known to the writer, are electric induction melting and holding furnaces used to the exclusion of all other types.

Aluminum die castings are not a novelty with Johnson Motors. The company made its own castings before the war but did not have as large a battery of machines for this purpose. During the war, setups for die casting were greatly augmented and the company took on the production of aluminum die castings, chiefly for aircraft and including some extremely large and complex castings. Some magnesium die castings were also produced.

Today, all these machines, and some new ones, are assembled in one plant and are set up in a continuous row running the length of the plant along one wall and are used for producing outboard motor components. With this arrangement it is possible to keep holding furnaces at all machines supplied with molten aluminum from ladles handled on trolleys along a monorail near the wall, from a single adjoining melting room just the other side of this wall.

In all, there are 14 Lester-Phoenix die casting machines and eight of Madison-Kipp make. All are of the cold chamber type in which the metal is hand-ladled from the holding furnace at each machine into the cylinder containing the injection ram. In Lester machines, fig. 1, the ram is horizotal and enters the dies by way of a hole forming a continuation of the injection cylinder. In the Madison-Kipp machines, the ram is vertical and below the die, with its axis in the die parting.

All machines have gas (nitrogen) loaded accumulators and are self-contained units with their own high pressure hydraulic pumps driven by electric motors. Hydraulic fluid from these pumps also feeds cylinders for die actuation and locking.

Casting machines are equipped with automatic timing units for controlling that part of the cycle which follows metal injection. Dies are closed when manual controls are shifted and metal is ladled in manually. But, once the control for injection is actuated by hand, the automatic controls take over, partly to avoid opening the die before the metal is solidified. In some dies, cores are hydraulically operated.

Besides operating the machines, ladling metal into them and removing castings, the operators are required to keep dies adjusted and at proper temperatures. They also spray die cavities with a solution of potassium bromide which helps to prevent sticking or "soldering" of castings to the die. This solution has some disadvantage in that it leaves undesirable deposits on castings, but it has proved to be the best "lubricant" of many tried to date.

Equipment and procedure used for producing and processing 70 tons of die castings daily in the plant of Electric Auto-Lite Co., Woodstock, Ill., was described in the article "Producing 70 Tons of Die Castings Daily," THE IRON AGE, May 9, 23 and 30, 1946.

Metal is injected at pressures ranging from about 20,000 psi to about 60,000 psi, depending upon the size and type of casting made. Castings range in size from about 1 oz to about 7 lb. The high pressure helps to insure sound castings. Casting rates range around 100 die fillings per hr except where the placing of inserts slows the cycle.

All casting machines are arranged at right angles to one wall of the plant, the injection end being nearest the wall and close to the holding furnace with which

Outboard Motor Parts

By HERBERT CHASE
New York

Production of aluminum die casting outboard motor parts at the plant of Johnson Motors, Waukegan, Ill., is described herein. Equipped with 22 casting machines, this plant is reported to be the first all-electric die casting installation in that induction heated melting and holding furnaces are used exclusively. Gate removal, casting cleaning and finishing, use of inserts and handling methods used in this modern plant are described in detail.

each machine is provided, as shown in fig. 2. Each of these Ajax holding furnaces is arranged for low frequency induction heating and is of 20-kw size. Automatic temperature control is provided by pyrometric equipment on a panel next to each furnace.

In general, dies are arranged for automatic ejection of castings and some cores are automatically operated. Operators lift castings out with tons and give them a preliminary inspection. Good castings are laid on a bench with which each machine is equipped and rejects are dropped into a compartment below the bench which is next to the aisle near the rear of the machine.

Inspectors working along this aisle pass good castings into tote boxes from which they are shifted, as required, to stations where gates are broken, sawed or sheared from castings. Runners, with slugs attached, and flash are placed in other tote boxes for return to the melting room.

Bays in which the casting machines are located are served by three overhead bridge cranes with hoists for handling the heavy dies. These cranes expedite die changing and help to keep casting machines busy by reducing down time.

To simplify alloying and handling problems and to aid in keeping separate the different alloys and scrap for remelt, only two alloys are used. One of these, commonly known as ASTM No. S5, contains 11 to 13 pct Si and is made only from virgin metal or remelts of casts, including runners and slugs ("biscuits"), made initially from virgin heats. This alloy is used for large and complex castings where higher fluidity is required.

The other alloy, AXS-679, contains 3 to 4 pct Cu and 4.5 to 9 pct Si. This is made from secondary ingots and remelt of casts, including runners, slugs and rejects, produced from the same alloy. This alloy is somewhat cheaper and easier to machine than the ASTM-S5 alloy, and serves well for average castings that are not too large.

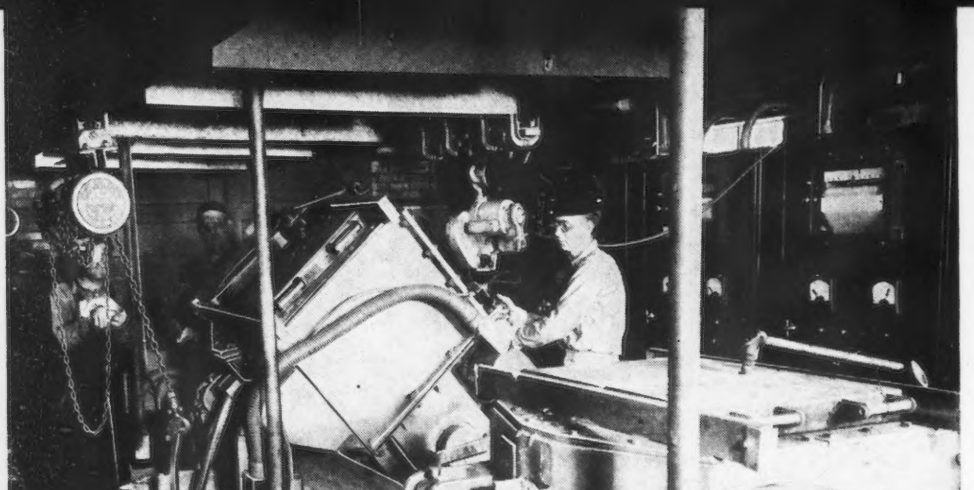
To aid in keeping the alloys separate, the melt made from virgin metal, is handled in ladles identified by green tags and is placed in holding furnaces above which tags of this color are hung. Similarly, the secondary alloy ladles carry red tags and serve furnaces marked with red tags. Every effort is also made to keep metal to be remelted segregated in lots that are suitably identified. To aid in this, dies using the virgin alloy are painted green and so marked that the slugs or "biscuits" each bear a cross. Thus, boxes of scrap to be remelted always contain slugs bearing a cross mark, if in virgin alloy. Slugs without this mark are known cast from secondary alloy.

All melting is done, normally, in five 60-kw, 300-lb per hr capacity Ajax induction furnaces, fig. 3, located in the melting room. Each of these has its own control unit in an adjacent cabinet, including pyrometers which hold the temperature, after melting, at 1300° to 1400°F. until the charge, except for a heel, is run off into carrying ladles.

Ladles are lifted by trunnioned bails, using a chain hoist on a monorail trolley and are shifted on this rail to a dolly and thence to a point at the center of the casting line. There ladles are transferred to another hoist on a trolley traveling the monorail that serves the holding furnaces.

Charges for the melting furnaces are weighed out

FIG. 2—View of half a row of die casting machines, all of which are located along one wall of the Johnson plant. The monorail serving the holding furnaces may be seen near the windows.



in trucks at bins where ingots of alloy and scrap are stored in the melting room. The five induction furnaces are normally capable of keeping all holding furnaces at machines supplied with molten metal. But, for standby use in emergencies, there is, at one end of the casting floor, a pair of gas fired furnaces which can supplement the induction furnaces if any of these are down.

In the casting room, there is storage space for some 300 dies in more or less active use. A fork truck shifts dies to the machines and returns those to be taken out of service there. All die handling is thus done by the truck and by the three cranes in the casting machine bay.

All piping for water, gas, electric leads and air required at casting machines is carried through a covered trench that runs the length of the shop under the rear ends of the machines. Water is used for cooling dies, and gas is employed for local heating in starting with cold dies, and air is used for cleaning and die spray work. With pipes below floor level, both the floor and the space below the cranes remains clear and unencumbered for moving dies and castings.

After castings that have passed inspection are deposited in tote boxes, they are picked up by the fork truck and are shifted to areas, comprising a large part of the casting plant, for removal of gates from castings and cutting off such flash as is to be removed before machining. Except for such snagging, nearly all machining on castings is done in adjacent shops or at other plants of the company that require aluminum die castings.

FIG. 3—Two of a battery of 60-kw Ajax induction melting furnaces. Metal is transferred from these furnaces to the ladle shown, for servicing holding furnaces. A control panel may be seen in the rear.

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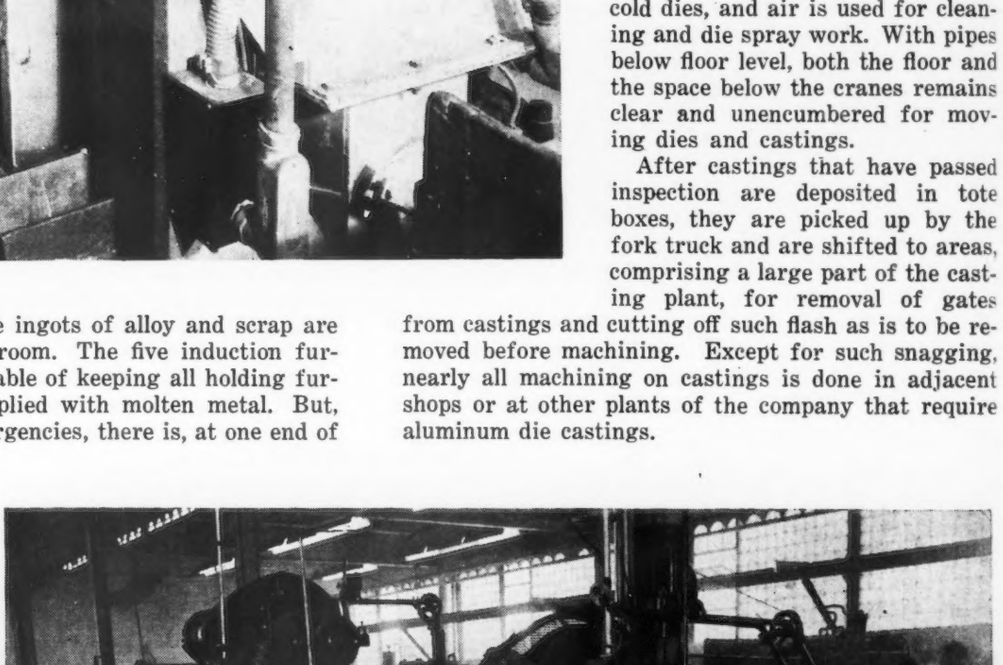
FIG. 4—Two of the punch presses where trim dies shear gates from castings. The die casting machines may be seen in the background. Short conveyors carry the trimmed castings to tote boxes.



Since the company uses all of the die castings it produces, the casting plant clears flash only from those castings that are cleaned to best advantage at that point, but does remove all runners and slugs. Some flash is commonly left at parting lines of those castings that have to undergo later machine operations in which the flash will be cut off. This avoids the need for putting these castings through trim dies.

Removal of gates from castings is done by one of three methods; hand braking where gates are thin and easily broken off; band sawing, where gates are heavy, and shearing in dies in punch presses. In some cases, trim dies not only cut gates from the castings but also shear off most or all flash.

Whichever method is used, the castings are deposited in tote boxes. Flash, runners and slugs are collected, in scrap boxes for return to melting furnaces. Some trim presses, fig. 4, are equipped with short inclined belt conveyors so set that castings forced through trim dies fall on the belt and are dropped from it into tote boxes. The press operator throws scrap from the gate into a scrap box. This setup is used chiefly for small castings and results in most rapid handling but requires, of course, that trim dies made for the particular casting or gate of castings be provided.

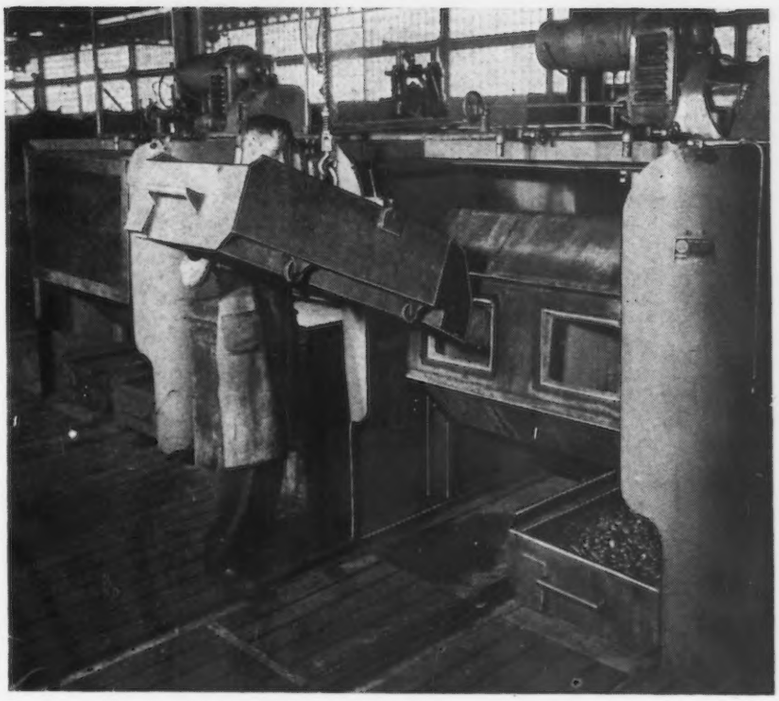


FIG. 5—A pair of Sturgis tumbling barrels, one of which is being charged by means of an ingenious chute arrangement that can be handled by one man.

Castings from which flash is not removed either in trim dies or in snagging operations (and that will not be cut away in subsequent machining) generally require some hand work, such as filing or scraping. This is done at benches. For many small castings, however, the removal of light flash and burrs is accomplished by wet tumbling in double-compartment Sturgis wood-lined barrels, fig. 5, two of which are kept in constant use.

These barrels are loaded from a scoop in which the charge is prepared in advance. The scoop is lifted by an electric hoist hooked through a central ring so that tilting is easily done. An average barrel charge consists of 100 lb of castings, 500 lb of granite chips and enough fine abrasive to produce the desired cutting action. The charge about half fills the barrel compartment and, when in the barrel, has enough water added to stand a few inches above charge level.

Barrels are octagonal and about 30 in. in diameter. They are rotated at 10 to 31 rpm and the average charge runs about 35 to 60 min. Granite chips used run up to about 1 in. in maximum dimensions and are of fairly uniform size, and never so small as to lodge in casting recesses. The abrasive used with the chips keeps them from glazing besides assisting the cutting action. Use of this process saves much hand labor and produces the desired degree of smoothness where light flash and burrs are broken off. Chips employed are always smaller than the castings themselves and so are easily separated from the castings by dumping on screens. Meshes in these are of such size that castings are caught and chips pass through for collection and reuse.

Many of the die castings made in this plant require that inserts be cast in place. Dies are so made that the inserts, placed by hand, are correctly positioned in the casting. One of the largest castings made includes two cast iron cylinder liners and three bronze crankshaft half-bushings. These are assembled in correct arrangement by die casting cylinders and part of the crankcase around them. This procedure saves a substantial amount of machining, especially as compared with making a casting in which the inserts would be applied later after suitable seats for them had been machined.

It is necessary, of course, to machine some surfaces of the inserts before they are applied but the half-bearings are made by conventional means and the cast iron cylinder liners require no machining on their outside diameter. The liners are sand cast in another foundry and, before being cast in place, are broached and then are faced on each end in turret lathes. Broaching is done to finished size so that no machining of cylinder bores is needed subsequently.

A LaPointe machine for this purpose is installed in the die casting plant and is arranged to broach three liners per stroke. The broaches have 44 lands, the last few of which perform a burnishing operation and leave bores that are extremely smooth and sized within close limits. As the liners are precisely located in the die on their machined surfaces, and in correct relation to the crankshaft bearings, the castings require only a small amount of machine work to make them ready for assembly into outboard engines.

As somewhat the same is true of other die castings produced, it can be said that outboard engine design is quite largely predicated upon the application of die castings. Full use of these is made, not only to effect economies in production, but to attain light weight. Die castings are applied in other units of the outboard assembly beside the engine itself, including the housing for the vertical drive shaft and the bevel gears that drive the stub shaft on which the propeller (also a die casting) is mounted.

FIG. 1—Welding of an 18-8 Ti exhaust assembly by the oxyacetylene process. o o o

Behavior of 18-8 Ti-Stabilized Stainless

o o o

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o o o

Effects of temperature on the physical properties and creep strength of columbium and titanium-stabilized types of 18-8 stainless steels are discussed in this article. Weldability, corrosion resistance and stabilization heat treatment are compared from the viewpoint of determining suitable commercial applications.

TABLES, I, II and III (shown in part 1, Aug. 8), and figs. 2, 3 and 4 (reproduced by permission of ASTM) give the mechanical properties of 18-8 Ti, 18-8 Cb and, for comparison, 18-8 type 304.[22] It will be noted that the addition of titanium to 18-8 has no appreciable effect on the room temperature tensile properties and the short-time elevated temperature tensile strength. This elevated temperature tensile data were given as a matter of general interest, even though such data may not be used for design purposes. In the latter instance recourse is made to creep data.[23-28] Table IV contains a compilation of creep data on the stabilized grades from various sources in the literature as well as recent data on type 321 as derived by the Dept. of Engineering Research of the University of Michigan.

In the first part of this two-part article published Aug. 8, 1946, the author discussed means for detecting and eliminating intergranular corrosion in 18-8 *stainless steel.*

A perusal of these data shows considerably higher values for type 321 than have heretofore been reported by other sources. These differences may well be the result of two factors, namely composition and heat treatment. As an illustration, the data at 1100°F clearly show the marked effect of Ti:C ratio, which difference does not exist at 1200°F. A further study of these data shows that the higher Ti:C ratio compares very favorably at 1100°F with the highest values reported for 18-8 Cb at the same temperature. At 1200°F the values are very similar to those reported by the ASTM for 18-8 Cb and are very much higher than the values reported by Timken, which are in fact lower than straight 18-8 reported by other sources. The net conclusion from these findings is that the opinions that 18-8 Cb is superior to 18-8 Ti, cannot be accepted and that further work is required to clarify the atmosphere. The detailed creep data on the materials tested by the University of Michigan will be forthcoming in the future with a complete record of heat treatment prior to creep testing.

In considering welding, an effort will be made to separate and discuss the numerous factors that enter into the complex problem of weldability of stabilized stainless steels. Weldability resolves itself into the following components: (a) character of weld, (b) behavior of resultant weld with respect to intergranular attack, (c) rate at which welding may be conducted to produce high quality weldments, (d) type of welding processes, and (e) the effect of nominal variations of composition within normally accepted specifications.

In the early days of welding stainless steel, too little attention was paid to the above and similar factors beyond producing a sound weld by arc or gas welding just so long as it was resistant to intergranular attack. However, recent comprehensive work has shown the effect of some of the variables enumerated.

In the case of electric resistance, flash or shot welding, all the austenitic steels behave similarly, including the stabilized grades. In arcwelding it is necessary at the present time to employ columbium-bearing rods for the welding of both 18-8 Ti and 18-8 Cb. This is related to the fact that titanium is much more readily oxidized than columbium and, accordingly, with normal titanium-bearing rods there is insufficient titanium left to provide immunity to intergranular attack in the weld bead. This condition may well be circumvented by employing proper titanium rods which is in the development stage at the present time.

The same general rules prevail when oxyacetylene weld rods are employed. However, the recent comprehensive data of Page[80] show that large tonnages of 18-8 Ti sheets have been flange welded (in this process no rods are used) very successfully by a reasonable control of the flame conditions. Page has admirably

demonstrated that 18-8 Ti can be very successfully flange welded with practically no carbon pickup and only a small loss in titanium content, insufficient to impair resistance to intergranular corrosion. Page also made a comprehensive statistical study which showed the very marked effect of manganese and silicon variations, within normal specified ranges, on welding speed. This clearly demonstrates that it is very simple to obtain high and low welding speeds between two heats of the same grade when all other variables are fixed.

Corrosion-Resistance

The general level of corrosion resistance of the 18-8 stabilized grades, types AISI 321 and 347 are on a par with one another except in certain specific cases. In such instances when one of these steels proves inadequate for a certain job, usually improved corrosion resistance can be had by switching to 18-8 Mo type AISI 316 which has a higher order of corrosion resistance than any of the other regular 18-8 grades. The principal objection to the type AISI 316 is that it is susceptible to intergranular carbide precipitation, though perhaps to a less extent, but the same type of intergranular corrosion failure is possible.

These remarks refer to annealed material without exception. There is a considerable divergence of opinion with respect to other heat treatments, such as stress relief anneals, which are in the same temperature range as that which sensitizes regular 18-8 to intergranular corrosion. After such stress relieving treatments, which are within the sensitizing range, 18-8 Ti and 18-8 Cb are of course immune to intergranular attack. Much has been made of the fact that under the conditions stated the loss in weight in boiling nitric acid is less in the columbium grade than in the titanium grade. This difference is clearly not a difference in intergranular susceptibility but is related to other factors not clearly understood at the present time. In any event, there is no basis for making the frequent unsupported conclusion that this difference in boiling nitric acid must, a priori, manifest itself in the numerous media that these steels are subjected to other than nitric acid. Even in nitric there is considerable doubt as to the wisdom of the laboratory test in relation to service. This is summarized by Keating[30] as follows and represents British experience over an extended period of time.

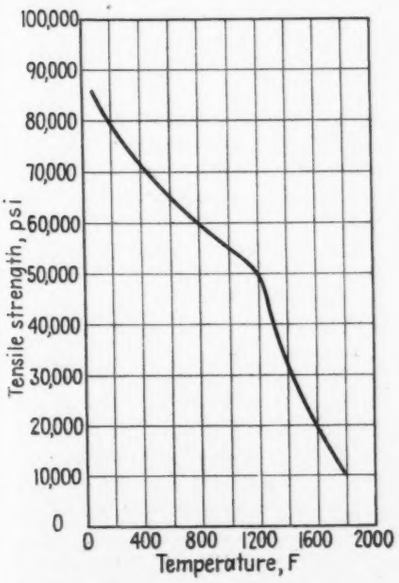

FIG. 2—Short time high temperature tensile properties of wrought 18-8 titanium-stabilized steel. (ASTM designations A 167-42, Grade 5, and A 240-42 Grade T; AISI 321).

"Over a period of years, Imperial Chemical Industries, Ltd., has obtained what would appear to be a satisfactory practical answer in purchases of 18-8 material. Our supplies, which are very large by standards in this country, are purchased to a specification which permits carbon up to 0.16 pct. A Ti:C ratio of not less than 4½: 1 is specified together with nickel and chromium in the normal quantities for 18-8. Carbon usually is on the order of 0.12 to 0.14 pct, and every heat is subjected to the copper sulfate-sulfuric acid test devised by W. H. Hatfield. Over a period of years, rejections at the suppliers' works have been negligible.

"In service, this material is used for a wide variety of duties in the heavy chemical industry, often under very severe condition of corrosion. Welding is now done with a columbium 18-8 electrode and no heat treatment of any kind is given to the material after full softening treatment by the producer. The performance of this material in, for instance, nitric acid manufacture, has been very satisfactory and our experience for several years has given no indication of necessity for reimposing more rigorous standards.

"In practice, however, we have not found, even in our severe conditions, that the corrosion resistance of 18-8 Ti is inadequate and, in fact, in a very large plant, we have no record of any wrought fitting having to be replaced in 15 yr by corrosion failure."

Stabilization Heat Treatment

There has been considerable discussion of the advisability and the inadvisability of the so-called stabilize annealing at 1550° to 1650°F to impart complete immunity to intergranular corrosion of stock containing the bare minimum of titanium or columbium with respect to carbon. This was first brought out by Bain, Aborn and Rutherford and represents a valuable contribution insofar as intergranular susceptibility is concerned. At the time that this work[5] was published this was an admirable contribution. However, at that time there was not enough information to indicate that a stabilizing anneal may be at a disadvantage from other aspects. More specifically the recent trends in creep testing rather clearly demonstrate that a stabilizing anneal may well represent the worst heat treatment insofar as creep strength is concerned.[23]

However, there is one instance where the stabilizing heat treatment is now used for both the 18-8 Ti and the 18-8 Cb grades and this does not involve creep resistance. This application is the stress relieving treatments called for by the ASME Boiler Code Specification (case 897) for unfired welded pressure vessels. The same treatment

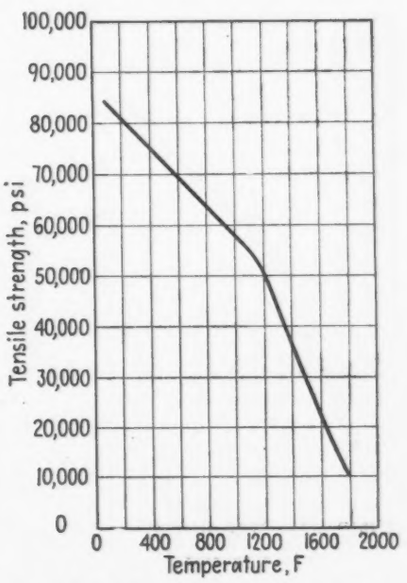

FIG. 3—Short time, high temperature tensile properties of wrought 18-8 columbium-stabilized steel. (ASTM designations A 167-42, Grade 6 and A 240-42, Grade C, AISI 347).

is specified for both these grades and calls for a heat treatment between 1550°F and 1650°F to be followed by air cooling or furnace cooling.

Thus, when this treatment is used a double purpose is served: (1) residual stresses from welding are mimimized and, (2) in those few instances where the Ti:C or Cb:C ratio is on the borderline minimum, the increased susceptibility to harmful intergranular chromium carbide precipitation is minimized because the carbon is precipitated as the relatively harmless carbides of titanium or columbium.

Some Commercial Applications

The unique qualities of titanium-bearing 18-8 make it readily adaptable for applications requiring the ability to withstand heating in the carbide precipitation range when followed by exposure to a corrosive environment. In this respect it is superior to ordinary 18-8. Type 321 is about on a par with 18-8 in the ease of fabrication, weldability, short time strength and oxidation resistance at elevated temperatures, but is superior in creep strength.

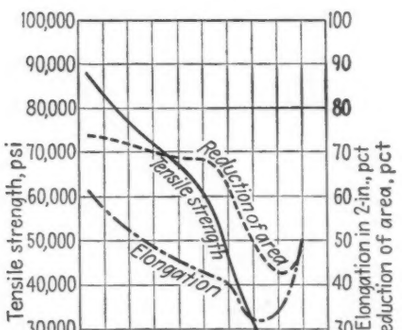

FIG. 4—Short time, high temperature tensile properties of wrought low carbon 18-8 stainless steel. (ASTM designations A 167-42, Grade 3 and A 240-42, Grade S; AISI 304).

One of the outstanding applications, and the one which has required the greatest tonnage during the war, is for various parts of the aircraft exhaust collector system. Fig. 1, illustrating welding of an 18-8 Ti exhaust assembly at the Solar Aircraft Co., shows the complicated system required for handling hot aircraft exhaust gases and the exacting demands made upon the steels selected for this job. A thin-walled structure is formed by stamping and is joined by welding. This structure must withstand considerable vibration, thermal shock and the corrosive action of hot exhaust gases.

During the past war millions of pounds of type 321 were used in this application and the steel gave a very good account of itself. Service failures that have occurred in these assemblies have been reported to be due to one of two types, both of which have been corrected by a change in design, such as an increase in wall thickness at a strategic point or a redesigning to lessen fatigue failures. Failures in this application, according to Hubbell's experience[31] have thus not been attributable to shortcomings of the steel. Plain 18-8 was proved to be unsuitable for this job because it was not resistant to the products of combustion encountered in the exhaust gases. This led to the use of the stabilized grades type 321 and type 347 for use on exhaust manifolds.

Considerable amounts of 18-8 Ti have been sold and successfully used for applications involving welding or brazing during fabrication or for use at elevated temperatures.

Contact with zinc, even in surprisingly small amounts such as drag from die stamping, is to be avoided[31, 32] at all costs when the steel is to be heated in excess of about 700°F in applications involving welding, brazing, annealing or in use. This is particularly important if stresses are involved because serious cracking of an intergranular nature will occur. This phenomenon is believed to be due to the formation of a low melting eutectic which is very brittle.

Use in the construction of chemical plant equipment and the handling of corrosive materials in this country and abroad has required considerable tonnages. British experience has already been mentioned previously. Other uses include furnace parts, heat exchangers, retorts, boilers, reaction vessels, etc.

Where there is so little to choose from in mechanical properties, formability, weldability and corrosion resistance with respect to the stabilized grades of 18-8, namely types 321 and 347, the question of economy, as far as the ultimate user is concerned, assumes increased importance. For this reason many users prefer type 321 because it affords a savings of about 10 pct in the base price for the various products.

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(References 1 to 22 were published with Part I of this article in the issue of Aug. 8, 1946)

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[24] "Resume of High Temperature Investigations Conducted During 1943-44," The Timken Roller Bearing Co., Canton, Ohio.

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[27] D. W. Rudorff, "Niobium (Columbium) as an Alloying Element in Heat Resisting Steels," Metallurgia *26*, Oct. 1942, p. 193.

[28] Private Communication.

[29] A. B. Kinzel and R. Franks, "Alloys of Iron and Chromium," *2*, McGraw Hill Book Co., 1940, p. 418.

[30] F. H. Page, Jr., "Weldability Factors for 18-8 Stainless Steel," Welding Journ. *24*, p. 929.

[31] F. Page, Jr., "Zinc—Saboteur of Steel at Elevated Temperatures," Am. Electroplaters Soc. *30*, 1943, p. 436.

[32] H. A. Campbell, "Stainless Steel Aircraft Exhausts," THE IRON AGE, June 24, 1943, p. 56.

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TABLE IV

Comparative Creep Strength at 1100° and 1200°F for 18-8 Ti Type 321 and 18-8 Cb Type 347 Stainless Steels

Type Steel	Creep Strength (1 pct in 10,000 hr), 1000 Psi	Source	Date	Heat Treatment Before Creep Testing
		1100°F		
321 (8:1, Ti:C ratio)	22.0[1] (approx)	Univ. Mich.[28]	1945-46	Normalized 1900°F
347	19.0, 25.0	Miller, et al.[23]	1943	Normalized 1900°F
347	21.0[1]	Timken[24]	1943-44	Normalized 1700°F
321 (5.8:1, Ti:C ratio)	16.5[1]	Univ. Mich.[28]	1945-46	Normalized 1900°F
347	14.0[2]	ASTM[22]	1942	Not stated
321	13.0, 15.0	Miller, et al.[23]	1943	Normalized 1900°F
321	12.4[2]	ASTM[22]	1942	Not stated
		1200°F		
321 (5.8:1, Ti:C ratio)	10.5[1]	Univ. Mich.[28]	1945-46	Normalized 1900°F
321 (8:1, Ti:C ratio)	10.0[1]	Univ. Mich.[28]	1945-46	Normalized 1900°F
347	9.4[2]	ASTM[22]	1942	Not stated
321	7.7[2]	ASTM[22]	1942	Not stated
347	5.3[1]	Timken[24]	1943-44	Normalized 1700°F

[1] Rate for 0.1 pct per 1000 hr.
[2] Interpolated.

Properties of Sintered Iron-Copper Powders

Effects of variation in sintering temperature, sintering time and copper content, on the physical properties of sintered copper-iron powders are discussed herein. The author also reports results obtained from various heat treatments conducted on sintered specimens, as well as a comparison between properties of as-received and annealed powders.

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WIDE use has been made of iron-copper powders with or without graphite for certain types of bearings and structural parts in industry. There is a great advantage in the use of copper with iron.[1] The strengths obtainable after sintering in the commercial types of atmosphere-controlled furnaces at a temperature of about 2010°F are far superior to those obtained with pure iron under the same conditions. This is caused by the wetting and alloying action of the copper with the iron upon melting.

It is possible to sinter a 10 pct copper-iron compact of pure electrolytic powders at 2190°F for 10 min and obtain a strength far superior to that of the same iron pressed and sintered at any temperature for any length of time. It becomes evident why industry has made such wide use of iron-copper powders.

[1] *See also "Cemented Steels,"* THE IRON AGE, *May 2, 1946, p. 50.*

Pure iron sintered at a temperature about 210°F under its melting point for 64 hr has a tensile strength of 38,600 psi and has full density, but the same iron plus 10 pct copper sintered at 2190°F for only 10 min has a tensile strength of 56,100 psi, an increase of 45 pct over that of pure iron. This result is not surprising, for experience has taught that copper-brazed steel joints have about the same strength as the steel itself. The strength of these joints follows that obtained by heat treatment, and in certain cases brazed tensile test specimens have broken in the steel instead of in the brazed joint. The evidence secured through the sintering of copper-iron compacts indicates why these joints should have such high tensile strengths.

The powders used for this work were electrolytic. The iron was reduced in small boats at 750°F in pure dry hydrogen for 3 to 4 hr to make sure there were no oxides present, and the surfaces of the particles were clean to secure the best wetting of their surfaces by the copper. The copper was reduced in pure dry hydrogen at 570°F for such periods as necesary to secure shrinkage of a compact pressed from it when sintered at 1650° to 1830°F.

The freshly reduced powders were tumbled in glass containers filled with coiled wire for 3 to 4 hr to insure mixing and to prevent cold working of the annealed powders. The mixtures were pressed at 30 tons per sq in.

The bars were placed on an iron boat covered lightly

TABLE I

Effect of Increasing Sintering Temperature on Physical Properties of 5 pct Cu-Fe Specimens
(sintering time = ½ hr; pressure = 30 tons per sq in.)

Specimen No.	Temperature, °F	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
58-1	2010	16,900	2.00	0
58-2	2010	23,400	3.00	0
103-1	2190	30,400	....	..
103-2	2190	25,900	2.28	0
104-1	2370	30,000	2.28	0
104-2	2370	38,000	3.43	0
105-1	2460	40,000	4.56	2.0
105-2	2460	43,300	5.71	1.0

TABLE II

Effect of Increasing Sintering Time on Physical Properties of 10 pct Cu-Fe Specimens
(Sintering temp = 2010°F; pressure = 30 tons per sq in.)

Specimen No.	Sintering Time, Hr	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
59-1	½	22,000	3.00	0
59-2	½	19,100	3.00	0
70-1	1	62,300	2.75	3.4
70-2	1	64,100	4.00	9.5
71-1	2	75,800	4.00	8.9
71-2	2	73,900	2.75	6.2
13-1	3	83,200	2.67	1.0
13-2	3	79,500	4.00	2.5
72-1	4	80,600	2.75	5.0
72-2	4	85,500	9.34	5.9
73-1	8	71,400	0	3.4
73-2	8	68,000	2.75	7.2
74-1	24	87,500	2.75	8.0
74-2	24	84,000	4.00	8.0

TABLE III

Effect on Copper Content and Sintering Time on Specimens Sintered at 2190°F
(Pressure = 30 tons per sq in.)

Specimen No.	Cu, Pct	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
Sintering Time = 2 hr				
6-1	10	68,600	1.56	6.0
6-2	10	76,400	1.56	6.0
7-1	15	68,100	1.56	2.5
7-2	15	63,800	1.56	2.5
8-1	20	69,900	1.56	6.0
8-2	20	68,600	1.56	2.5
9-1	25	76,900	2.67	1.5
9-2	25	55,500	0	0
10-1	30	62,600	1.56	1.5
10-2	30	57,100	1.56	2.5
Sintering Time = 10 min				
11	5	43,600	1.56	1.0
12	10	56,100	1.56	1.5
1	15	50,230	1.30	1.5
2	20	51,500	1.30	2.5
3	25	45,200	0	0
4	30	35,500	0	1.0

TABLE V

Effect of Variation in Copper Content and Sintering Temperature on Physical Properties
(Sintering time = ½ hr; pressure = 30 tons per sq in.)

Specimen No.	Cu, Pct	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
Sintering Temperature = 2010° F				
58-1	5	16,900	2.00	0
58-2	5	23,400	3.00	0
59-1	10	22,000	3.00	0
59-2	10	19,000	3.00	0
60-1	15	30,700	3.00	0
60-2	15	33,200	4.00	1.0
61-1	20	40,300	6.00	2.5
61-2	20	37,100	6.00	4.1
62-1	25	43,800	7.00	5.0
62-2	25	48,200	8.00	5.0
63-1	30	46,400	6.00	5.0
63-2	30	48,600	6.00	4.1
Sintering Temperature = 2190°F				
103-1	5	30,400	....	..
103-2	5	25,900	2.28	0
106-1	15	48,700	4.56	0
106-2	15	53,000	2.28	0
109-1	25	62,000	2.28	0
109-2	25	52,500	3.43	14.5

with Al_2O_3 to prevent sticking of the compact to the boat. This boat was placed in a tubular container provided with runners to hold the boat away from the wall of the furnace. The container was provided with a long inlet tube of about 0.405 in. OD and closed at the other end by wiring a 0.002 in. sheet of iron over it. The cover was not absolutely tight, but allowed a flow of 8 cu ft of hydrogen per hour through it.

The tube containing the charge was introduced into the cooling chamber of the furnace with the gate closed. A split rubber stopper provided with an opening to take the inlet tube was inserted to close the cooling chamber, and pure dry hydrogen was connected to the inlet tube for at least 10 min to wash out the air. At the end of the 10 min, the gate was opened between the cooling chamber and the heated surface, and the charge pushed into the center of the furnace by means of the inlet tube. At the end of the heating period, it was withdrawn to the cooling chamber and the gate closed.

The temperature was controlled by means of a 12W, 88Ni-Ni thermocouple connected to a temperature controller. The thermocouple was placed outside the container but above the very center of the charge.

The molybdenum-wound, alundum-tube hydrogen furnace was operated through a saturable reactor where the current was always on but had a variation in current between the high and low of about 10 amp, which insured control of the temperature betweeh ±9°F. The time was taken from the instant the recorder registered the desired temperature. Pressed compacts 5/16 x 5/16 x 2 9/32 in. were used for this investigation.

The results were obtained on duplicate specimens. There was considerable variation between specimens of the same composition treated in exactly the same way (generally true of specimens made from powdered metals). The tensile test specimens were threaded at both ends and machined according to fig. 1.

Table I presents data secured on specimens having a composition of 5 pct Cu, 95 pct Fe. The outstanding facts indicated from these data are that the tensile strength and the ductility increase with increase in sintering temperature. This is to be expected because the diffusion rate increases with the temperature.

The data listed in table II were secured on tensile specimens machined from bars sintered at 2010°F for various lengths of time, but containing 10 pct copper.

These data bring out the fact that sintering time is also very important, but perhaps just as important in this case is the percentage increase in copper content which results in a higher diffusion rate. The increase in ductility with the time of sintering is also very pronounced. The fact that 10 pct copper is about the maximum soluble by iron at the melting point of copper indicates that there is not much to be gained by the use of larger amounts of copper, even if higher temperatures and longer sintering times are used. This is confirmed by the data given in table III where the temperature of sintering is raised to 2190°F and the time increased to 2 hr.

It just happens that specimens 6-1 and 6-2 have the highest combination of strength and ductility. The elongation of 1.5 pct seems to be consistent in spite of the varying percentages of copper.

Single specimens of various copper contents sintered at 2190°F for only 10 min show a decrease in ductility with increase in the percent of copper. The data are also given in table III. The time factor in-

TABLE IV

Effect of Variation in Sintering Temperature on Properties of 10 pct Cu —90 pct Fe Specimens
(Sintering time = 3 hr; pressure = 30 tons per sq in.)

Specimen No.	Temperature, °F	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
13-1	2010	83,200	2.67	1.0
13-2	2010	79,500	4.00	2.5
14-1	2370	76,800	4.00	2.5
14-2	2370	78,500	5.34	2.5
15-1	2460	79,000	5.34	2.5
15-2	2460	78,200	4.00	6.0

TABLE VI

Effect of Annealed Powders on Physical Properties
(Sintering temperature = 2010°F; sintering time = ½ hr; pressure = 30 tons per sq in.)

Annealed Powder, No.	As-Received Powder, No.	Cu, Pct	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
58-1	....	5	16,900	2.0	0
58-2	....	5	23,400	3.0	0
....	64-1	5	29,000	3.0	0
....	64-2	5	35,400	2.0	0
59-1	....	10	22,000	3.0	0
59-2	....	10	19,100	3.0	0
....	65-1	10	52,400	3.0	0
....	65-2	10	40,900	1.0	0
60-1	....	15	30,700	3.0	0
60-2	....	15	33,200	4.0	1.0
....	66-1	15	50,400	3.0	0
....	66-2	15	45,600	3.0	1.5
61-1	....	20	40,300	6.0	2.5
61-2	....	20	37,100	6.0	4.1
....	67-1	20	52,400	3.0	0
....	67-2	20	51,400	3.0	1.0
62-1	....	25	43,800	7.0	5.0
62-2	....	25	48,200	8.0	5.0
....	68-1	25	57,700	5.0	2.4
....	68-2	25	61,900	5.0	4.0
63-1	....	30	48,400	6.0	5.0
63-2	....	30	48,600	6.0	4.1
....	69-1	30	69,700	6.0	3.4
....	69-2	30	70,000	7.0	4.9

TABLE VIII

Effect of Heat Treatment on Physical Properties of 25 pct Copper Specimens,
(Sintered at 2190°F, for 2 hr; pressure = 30 tons per sq in.)

Specimen No.	Tensile Strength, Psi	Elongation, Pct	Reduction Area, Pct
36	73,200	4.0	7.0
38	70,500	6.6	10.6
39	63,800	4.0	7.4
40	67,400	5.34	10.6
36-1	88,000	2.67	1.0
36-2	100,000	1.33	1.0
37-1	93,000	1.33	3.0
37-2	100,000	1.33	1.0
38-1	42,100	4.0	3.4
38-2	89,700	4.0	8.3
39-1	67,400	14.65	16.8
39-2	65,000	9.35	7.5
40-1	71,200	5.34	7.0
40-2	61,000	4.0	5.0
23-1	76,900	2.67	1.5
23-1	55,500	0.0	0.0

Nos. 36 to 40 were reheated to 1830°F for ½ hr, water quenched, and then aged at 930°F for 3 hr. Nos. 36-1, 36-2 reheated 2010°F ½ hr, water quenched. Nos. 37-1, 37-2 reheated 1830°F ½ hr, water quenched. Nos. 38-1, 38-2 reheated 1650°F ½ hr, water quenched. Nos. 39-1, 39-2 reheated 1470°F ½ hr, water quenched. Nos. 40-1, 40-2 reheated 1110°F ½ hr, water quenched. Nos. 23-1, 23-2 as sintered.

volved in these last data is too small to bring about complete solution of copper in the iron or complete saturation of the copper by iron, but here, once more, specimen 12, table III, exhibits the best all-around properties when compared with the others treated in the same manner.

Then again, fixing the time of sintering at 3 hr, one finds very little difference in the physical properties of the 90 Fe-10 Cu specimens regardless of the temperature of sintering. The data presented in table IV will illustrate the point. There is some evidence that there is slightly more ductility in those samples sintered at 2370° and 2460°F.

Influence of Copper Content

Examination of the data in table V, obtained on specimens of different composition sintered at 2010°F for ½ hr, shows the importance of concentration of copper.

The difference in diffusion rates due to difference in copper concentration does not account for the increase in tensile strength entirely, because the increase in copper also favors the elimination of more voids upon melting. This eliminates some of the sources of weakness and increases the strength as well as the ductility. If the temperature is increased to 2190°F, the tensile strength increases with the temperature as is also shown in table V. If the temperature is increased still further, the relationship still holds, but the difference between the tensile strengths of the 5 pct Cu specimens and the 25 pct Cu becomes less at 2460°F. The greatest improvement in ductility, however, will be noticed at the highest temperature.

It has been observed in pressing pure iron compacts at various pressures that the powder in the as-received condition seemed to be hard. The compacts pressed at 30 tons per sq in. might crumple at the corners and in some cases exhibited cracks at right angles to the direction of pressing. The hardness might be due to the hydrogen held by the iron, or from the work hardening during disintegration of the electrode material, or both.

This observation gave rise to the thought that there might be some difference in properties of compacts pressed from powders in the as-received condition and those pressed from annealed materials. The results, table VI, obtained were quite convincing.

In order to have these results comparable, the entire series of each type of iron was sintered together at one time under the same conditions. This was possible because of the size of the compacts A comparison of the tensile strengths of specimens of like composition in each series reveals the superior properties of those made from unannealed iron powder. This tends to confirm some of the fundamental ideas concerning diffusion rates in metals under stress.

Heat Treatment of Compacts

Since the solubility of copper in iron decreases rapidly from the melting point of copper to room temperature, and the same is true of the solubility of iron in copper, it was decided to try some quenching and aging treatments of various sintered compositions. There was not enough work done with the aging to

TABLE VII

Effect of Heat Treatment on Physical Properties of 10 pct Copper Specimens, Sintered at 2010°F, Pressed at 30 tons per sq in.

Specimen No.	Sintering Time, Hr	Tensile Strength, Psi	Elongation, Pct
A1[1]	2	47,500	2.67
A2[1]	2	46,000	2.67
A3[2]	2	31,600	1.33
A4[2]	2	32,600	5.30
A5[3]	2	54,500	2.67
A6[3]	2	50,000	1.33
A7[1]	4	58,500	2.67
A8[1]	4	53,800	2.67
A9[2]	4	44,300	3.56
A10[2]	4	41,100	3.56
A11[3]	4	76,400	2.67
A12[3]	4	69,300	2.67

[1] As sintered. [2] Reheated to 1470°F for ½ hr and water quenched. [3] Reheated to 2010°F for ½ hr and water quenched.

determine the proper composition to secure the effect or the time and temperature necessary. It was found, however, that the tensile strength of water-quenched specimens ranged as high as 100,000 psi and that stresses set up in a large bar ⅝ in. square x 7½ in. long were great enough to cause rupture of the bar. The small specimens seemed to take the quench with none of this difficulty.

It was also found that the strength increased with the quenching temperature up to 2010°F, regardless of the composition. The data shown in table VII illustrate these points. The increase in tensile strength

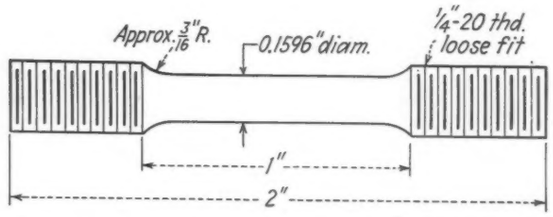


Fig. 1—Specification for preparation of tensile specimen.

secured by quenching at 2010°F over that of the as-sintered specimens is very pronounced.

Increasing the coppen content gave corresponding results after sintering at 2190°F for 2 hr. They are given in table VIII.

There is little gained by quenching and aging specimens 36 to 40 from the standpoint of tensile strength, but the ductility is greatly improved. It may be that this high percentage of copper might not exhibit aging, but if it does these specimens have probably been overaged.

The ductility of specimen 39-1 is outstanding, while that of 39-2 is also high. It may be that this particular quenching temperature is desirable to secure the greatest ductility.

Since these materials are so sensitive to temperature and cooling rates, it may be that in some instances, the heat treatment might account for some of the variations in properties.

Conclusions

The strength and ductility of 5 pct Cu-Fe mixtures when pressed and sintered for ½ hr at temperatures of 2010° to 2460°F increase with the temperature of sintering. The strength and ductility of 10 pct Cu-Fe mixtures when pressed and sintered at 2010°F for various lengths of time increase with the time of sintering. Tests on mixtures of 5 to 30 pct Cu-Fe seem to indicate there is not much to be gained in strength by using greater amounts of copper.

The tensile strength of 10 pct Cu-Fe mixtures sintered for 10 min at 2190°F is greater than can be attained by sintering pure iron at any temperature for any length of time. Mixtures of 10 pct Cu in iron sintered for 3 hr at 2010°F to 2460°F show about the same strength, but the ductility increases with the temperature of sintering. If the temperature of sintering is maintained at 2010°F for ½ hr, the strength and ductility increases with the copper content up to 30 pct.

Under these fixed conditions (2010°F for ½ hr) of sintering, unannealed electrolytic iron powders give higher strengths than annealed powders. Compacts of copper-iron are heat treatable in small sizes ¼ x ¼ x 2¼ in. In larger sizes, ⅝ x ⅝ x 7½ in., they crack on quenching. Strengths of 100,000 psi are attainable in small specimens.

Porcelain Enamel Coating for Aluminum

By J. F. MASON

Reynolds Research, Glen Cove, N. Y.

PORCELAIN enamels in various colors may be applied to aluminum and aluminum alloy surfaces to obtain a hard abrasion and heat resistant finish. Aluminum articles to be coated with porcelain enamel are first freed of grease and oil, by solvent vapor degreasing. The alkaline cleaners are not satisfactory for this operation. After cleaning, the work is coated with one coat of ground coat enamel and air dried. This is followed by two coats of white or one or two coats of colored enamel applied by spraying or dipping. The porcelain enamel frit is mixed with water for this application. The optimum coating thickness is about 0.006 in. for two or more coats, but the coating thickness may vary from 0.002 to 0.009 in. The work, after coating, is immediately air dried or dried by means of hot air or in a drying oven. This is important, since the enamel contains free alkali which will cause surface corrosion and prevent adhesion of the ceramic coating if allowed to remain in the wet state on the aluminum surface.

The coated parts are then placed in a furnace, maintained at a temperature of 920±10°F. The work should be held at this temperature for 5 to 8 min in order to allow the enamel coating to fuse and to attain the glazed finish desired. Firing is necessary after each top coat is applied. The shape of the parts will determine their position in the furnace.

The vitreous enamels are fused at fairly high temperatures, in so far as aluminum and its alloys are concerned and, consequently, there may be softening of the metal and distortion of the thin gages if it is left at heat for too long a period. These coatings are glass-like and brittle, but have excellent adhesion to aluminum if properly applied.

The high temperatures employed in baking these ceramic coatings on aluminum and its alloys will have an effect on the strength of the metal. All temper rolled sheet will be annealed to some degree, and heat treatable alloys will be partially heat treated. The full strength of heat treatable alloys is not obtainable since the temperature is limited to the baking temperature and coated material cannot be quenched.

These coatings are normally not too resistant to slow moisture penetration, or to acid or alkalies. However, certain types of porcelain coatings have been developed which have improved these characteristics considerably.

The ceramic coatings on aluminum are being considered for a wide variety of uses, such as table tops, trays, bicycle frames, furniture, and bathroom fixtures.

High Speed Spectrography

By LOUIS E. OWEN
Chief Spectrographer,
Reynolds Metals Co.,
Louisville, Ky.

Modification of standard spectrographic equipment to adapt it for high speed routine analysis is described in this, the concluding part of a two-part article. The components covered herein are the masking device, the photographic timer, the microdensitometer, and the calculator.

A MASKING device has been added to the spectrograph in order to increase the number of spectra which can be recorded on one length of film. The plywood spacer between the film carrying case (called the camera) and the spectrograph housing was removed and replaced with an aluminum frame, fig. 4, of identical dimensions. The aluminum frame is internally slotted so that a hard rubber mask can be inserted horizontally into the optical path of the spectrograph. This mask stops against a set screw that can be adjusted to compensate for slight shifts in spectra position arising from any source. The masks can either have large general openings for extended wave length regions or small slits permitting only narrow wave length regions containing specific desired line patterns. These slits must be of such size and accurate location that they do not introduce untoward effects on the transmitted lines due to their own action as diffraction sources. The masks permit only the portion of the spectra necessary for an analysis to fall on the film. Except for qualitative work, the length of the spectra for necessary wave length region is less than the minimum length of film that can be processed; therefore, it is possible after filling a section with spectra vertically to move the film horizontally a distance equal to the length of spectra exposed and record another series of vertical spectra. For some alloy masks this horizontal racking can be done three times. With line slit masks, a very small horizontal shift of the masks permits a second frame of vertical spectra to be recorded after which a longer shift as with the other masks permits a third frame to be exposed after which another small shift permits a fourth series of exposures.

The use of these masks, together with the special vertical camera racking, has made it possible for the Reynolds' laboratories to record as many as 60 spectra of 20 samples on one film (17 in. strip 35 mm) with nine elements per sample being determined or 80 samples for purely qualitative work. The nature of the work load makes the two frame masks for 18 spectra the most popular.

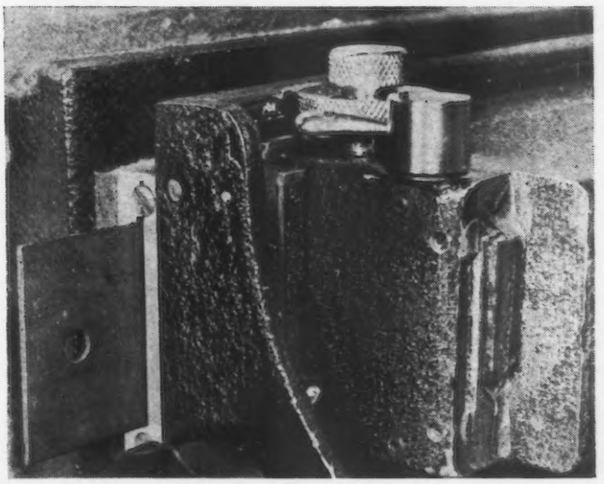
A new precise timer and temperature controller for photographic processing has been developed for the Reynolds' laboratories. It is shown in fig. 5 connected to the developer machine. This instrument has been completely explained in an earlier paper.[1] The main time base is provided by the same type of cam unit as described in the section dealing with the spark source timer. In the case of the photographic timer, the synchronous motor drives a shaft carrying six cams. These cams provide circuit control which from a momentary push button start performs the following indications; (1) buzzer sounds a warning slightly before end of development period, (2) pilot lamp is illuminated at end of time fixed for developing, (3) second pilot lamp is illuminated at the end of the period for stop-development hardening, (4) third pilot lamp is illuminated at the end of time set for clearing-fixing, and (5) all lamps are extinguished at end of wash period. The timer circuit also maintains the rocking

In the first part of this article, which appeared in the issue of Aug. 8, the author described modifications to the safety hood, the spark source, and the camera.—Ed.

The author Mr. L. E. Owen is now associated with the New York State Research Institute, Saratoga Springs, N. Y. When this article was prepared he was chief spectrographer at Reynolds.—Ed.

[1] *L. E. Owen, Rev. Sci. Inst.*, 1946, 17, *No.* 4, *p.* 155.

FIG. 4—Masking device, added to spectrograph to increase number of spectra recorded per length of film.



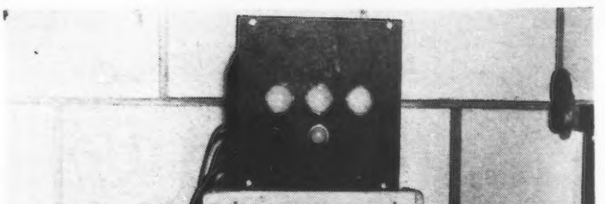


FIG. 5—Newly developed timer and temperature controller shown connected to the developer machine.

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of the processing machine during the period from the start of development through the end of the fixing time. Also incorporated in the timer case is a control circuit which maintains the temperature of the solutions at a fixed level. The primary temperature indication is provided by an expanding shell type of thermo-switch. This switch controls a sensitive relay which in turn monitors a relay powering a solenoid valve which provides for the introduction of refrigerated water into a bath surrounding the trays of photographic solution. It also controls a power relay for the rocking motor of the processing machine. This insures temperature equilibrium throughout the water bath.

The timer-temperature controller instrument has been found to be superior to anything comparable on the market both as to accuracy and convenience. The original mechanism has been in use for well over a year in which period it has operated without adjustment for over 20,000 timing cycles. Recent examination disclosed no wear calling for component replacement.

Microdensitometer

The microdensitometer has been modified primarily for ease and increased speed of operation. Substantially greater stability and increased accuracy have also resulted from some of the changes, although the commercial instrument was not particularly remiss in this respect.

A major addition to the microdensitometer was the incorporation in the assembly of an additional voltage regulator of the reactor-capacitor type preceding the electronic voltage regulator designed to feed the main components of the densitometer. Experience had shown that while the electronic regulator was very efficient it could not handle the occasional extreme variations invariably present in the Reynolds' plants lines. The addition of the more inexpensive regulator between the electronic and the voltage supply insured continuous operation. The double regulating action provided a nearly perfect stable voltage for the main projection lamp assembly and amplifier circuit. An improvement to the operating ease of the densitometer was brought about by the addition of neutral filters to the optical path of the machine. These filters were placed over the projection lenses inside the top assembly carrying the screen of the instrument. The filters reduce the intensity of the light on the screen thereby reducing the eye fatigue of the operator. They interfere in no way with the operation of the densitometric principle.

The film or plate carriage of one of the microdensitometers has been changed to include power drive. Inside the machine a reversible, dynamic braking gear motor has been mounted to drive the steel tape which positions the plate carriage and hence the spectra on the scanning screen. The motor is controlled by means of foot switches. Mention is made of this motor device not as a suggestion for routine laboratories but for those laboratories in which highly trained operators are employed. Reynolds found that the positioning of the spectra by such means called for interest and technique higher than that usually associated with routine operators. If a small variable speed reversible motor incorporating dynamic breaking could be obtained, it is quite likely that this modification to the densitometer would be of general value.

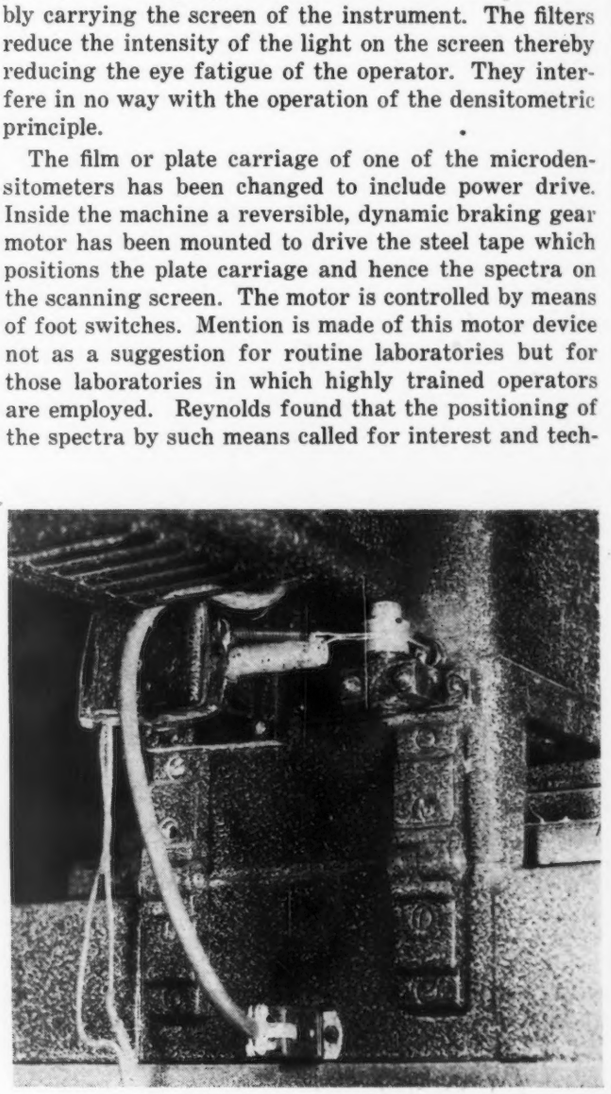

FIG. 6—A solenoid slit head device, which greatly increases speed and ease of taking densitometric readings.

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Solenoid Operated Slit Head

A modification of the densitometer that has been of very great usefulness in routine work is the substitution of solenoid for manual operation of the slit head positioner. In the commercial instrument it was necessary to depress a bar knob on the face of the ma-

chine in order to bring the slit head into its reading position every time a transmission value was to be obtained. After obtaining a reading, it was necessary to release the slit head by pressing on a button on the bar knob before another line could be selected for reading. By actual count, these two operations occurred as often as 50,000 times in one month's use of the instrument. The expedition of this simple operation greatly increased the speed and ease of taking densitometric readings.

To change over the slit head position from manual to solenoid operation, a small opening was made through the rear wall of the scanning head inclosure of the slit head mechanism. Through this hole was passed a small cable which engages the slit head mechanism at the same point, though opposite side, at which the manual push rod does. This cable passes over a small pulley on the outside of the machine and is attached to a dc solenoid which provides the power. It is shown in fig. 6. Where before a manual rod pushed the mechanism into position, now the energized solenoid provides a pull from the opposite side for the same action. The dc voltage for the solenoid is furnished by a selenium oxide rectifier with capacitor filter. The input to the rectifier is controlled by a foot switch located on the same treadle as the carriage motor switches previously described.

The voltage regulating and most of the control parts of the densitometer have been moved into the space in the densitometer desk originally allocated for film storage. These can be seen in the general view of the modified desitometer assembly shown in fig. 7. The compartment is ventilated by an exhaust blower which draws the incoming air through a filter. This air is first used to cool the tubes and transformers of the electronic voltage regulator. The service life of the tubes has been extended as a result. The compartment also contains relays and control assemblies which protect all the various major components from incorrect sequence and time of operation. Provision is further made to insure that the entire machine is fully ready for operation before reading can begin.

All controls of the densitometer and voltage regulators have been moved to the panel space of the amplifier unit of the machine, as shown in fig. 8. The controls for which the operators are responsible have been cut to the minimum, less than one-third the original number. The machine as modified, therefore, is much faster and less fatiguing to operate. Its reproducibility from operator to operator has been improved substantially, as there are fewer adjustments which can reflect the personal factor. The improved inherent stability of the circuits also adds to increased speed in its use.

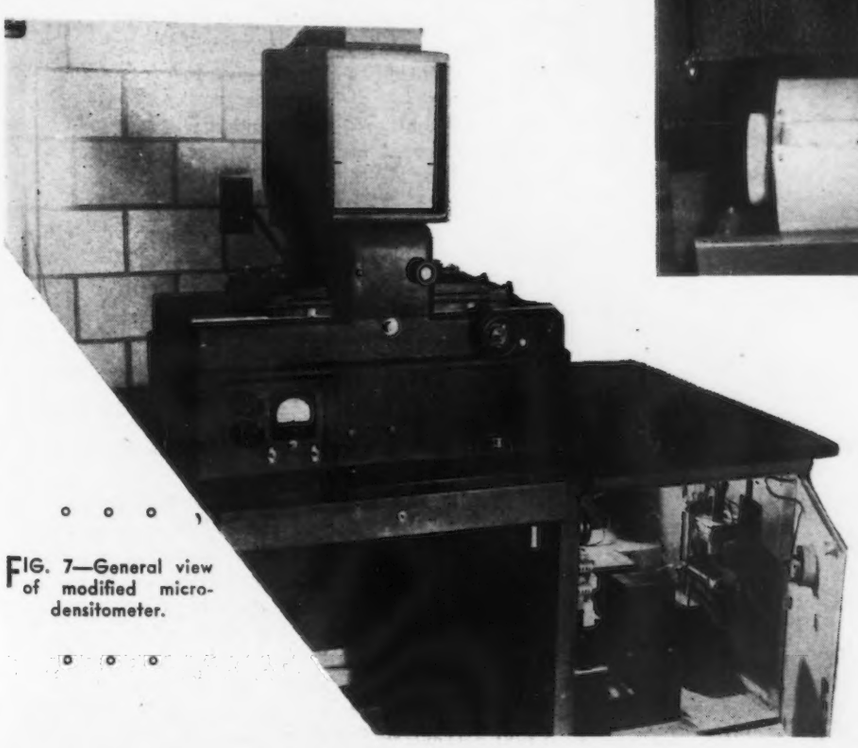
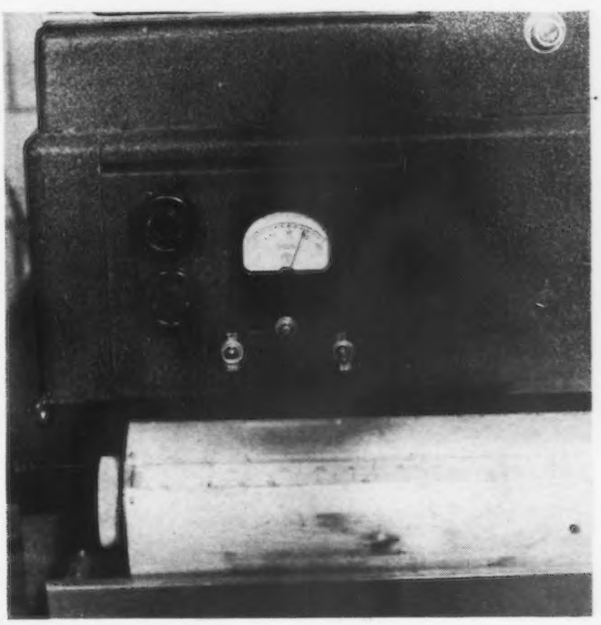


FIG. 7—General view of modified micro-densitometer.

The Calculator

The conversion of the densitometric measurements of the recorded spectra to alloying constituent concentration is accomplished by the use of a rotary calculator, fig. 8, which is not original with this laboratory. This calculator consists of an enclosed rotating drum which is viewed through an opening in its cover. The drum carries a series of scales which are the horizontal projections of concentration versus intensity ratio* graphs aligned according to point of equal intensity

Fig. 8—Densitometer amplifier case and rotary calculator.



(comparison-analysis line). The transparent slide carries a scale which is the horizontal projection of a gamma curve derived by any suitable means and graphed with the same logarithm constant used for the concentration intensity ratio curves.

To operate the calculator, the transmission value of the comparison line is set upon the slide scale against the line on the drum which represents on each concentration scale

the point of equal transmission.** Then the transmission value of the analysis line is read. The concentration for the particular element involved is obtained from the proper drum scale at the point immediately opposite the location of the analysis line transmission value on the slide scale. The scales on the drum also include the logarithmic scale used for all graphs. The slide scale operated against this gives intensity ratios* for use in making calculation for alloys on which analytical curves have been determined but which have not been drawn for a rotary calculator. The calculator is of such a size as to be very conveniently operated by one person, who at the same time can be making the densitometric readings and recording the analysis obtained.

** Intensity ratio is a common term, although not strictly correct. It is used here because it is well-known and recognizable.*

*** Point of equal transmission of spectral lines. Ficucal point, index, equivalence point, etc.*

Summarizing, the equipment modifications and new installations that have been described in this article are presented as items of interest to other spectrographic laboratories with a routine load. Their application in the Reynolds' laboratories has resulted in greater speed of analysis, higher reproducibility of results and lowered operator fatigue. The actual machines modified will be recognized by workers in this field as being of Arl-Dietert manufacture. The changes, however, are in no way necessarily applicable only to this line of equipment.

As a corollary to the foregoing work, it might be mentioned that for routine laboratories desiring the highest possible precision that complete air-conditioning, including relative humidity control is of great benefit. Spectrographic laboratories with modern equipment, using photographic material as an intensity integrating device, can probably increase their precision more by the use of complete temperature-humidity control wherever the photographic material is handled, than they can by any other single point of attack.

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Improving Cutting Properties of High-Speed Steel

A COMPARISON between cutting properties of high-speed steels tempered in the normal manner and cutting properties of high-speed steels given a subzero treatment is noted by K. J. B. Wolfe in an article entitled "The Sub-Zero Treatment of High Speed Steel, With Special Reference to Intermittent Cutting," *Metal Treatment*, Summer Issue, 1946.

From the standpoint of intermittent cutting, where impact loading and fluctuating loading are important factors (shaping, planing, gear generation by shaping methods), Wolfe conducted tests on three steels, 18-4-1, 6-6, and 22-4-1 plus 10 pct Co.

The conclusions drawn are that the cutting efficiencies of the three steels tested are dependent on the number of temperings, subzero treatments or combinations of the two, with tempering at 1075°F having a greater effect than the subzero treatment at —105°F. In the 18-4-1 and 6-6 grades, the maximum cutting efficiencies are produced by two 1-hr tempering operations at 1075°F, while four 1-hr treatments at 1075°F are necessary to develop the maximum cutting efficiency of the 22-4-1 plus 10 pct Co grade.

It was found that for a steel so treated that virtually all the austenite had been converted to martensite, subzero treatment at —105°F had no effect on cutting efficiencies. In those instances where the austenite to martensite transformation was insufficient, however, a subzero treatment improved cutting efficiencies. While no beneficial effects are realized from subzero treatment of correctly heat-treated commercial high-speed steels, its application may be helpful for certain high-speed steels containing high carbon and/or high vanadium. While the austenite produced in these steels is very resistant to transformation to martensite at tempering temperatures normally employed, it can be easily converted at temperatures in the region of —105°F.

New Process Weaves Metals

A NEW process being used by General Electric Co. to weave various metals for decorative grilles in radio receivers can also produce countless patterns of woven plastics, wood and rubber which may find numerous domestic and industrial applications, according to E. A. Malling, a sales manager in the G-E specialty division at Syracuse, N. Y.

The new process is called multi-weaving. Machines which produce the woven patterns are now in operation at the Wolf St. plant of the company's electronics department making the multi-weave radio set grilles. Multi-weave patterns may be composed of materials of the same or different family groups, or any combination.

The strands and fillers used in multi-weaving are held securely in position under tension at the points of intersection. The metal or other material used does not vibrate under acoustical or mechanical force, and has a stiffness factor which prevents buckling or wrinkling.

The weight and size of the multi-weave design is determined by the gage of the material desired. In manufacturing a broad range of designs, the multi-weave machine makes single or multiple, wide or narrow strands in a variety of colors and different finishes.

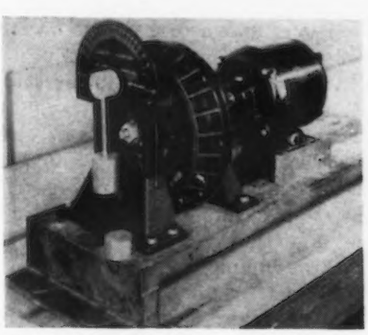
Following are a few possible applications for multi-weave material: Air conditioning and heating grilles, window blinds, many types of screens, lawn furniture, ship walks and protective railings, decorative partitions and attractive flooring.

New Equipment . . .

Testing and Measuring Instruments

Dynamometers, ductility testing machines, coil and engine mount testers, strain-gage amplifiers, frequency meters, process timers and gages of various types are among the improved testing equipment and meters described in this week's pages of manufacturers' announcements.

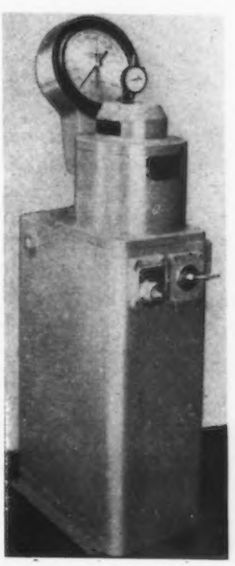
DYNAMOMETERS of the eddy current type with dc excitation, for measuring torque and horsepower of fractional horsepower motors, including flea-power, have been offered by the *L. A. B. Corp.*, Summit, N. J. These self-damping, self-cooling units, said to be more accurate and convenient than Prony brakes, are designed for uninterrupted and continuous service, permitting one-man operation, and are adapted to both running and stalled torque measurements. They are suitable for testing electric, hydraulic, pneumatic or internal combustion motors and flexible shaft transmissions. They have no springs or frictional devices. Torque loads are varied by rheostat adjustment. The smallest



size measures torques at speeds up to 15,000 rpm and up to 10 oz-in. The size illustrated measures up to 25 in.-lb.

Ductility Testing Machines

DUCTILITY testing machines, model PA-2 with a 15,000-lb capacity for stock up to ⅛ in. in thickness and model PA-3 with 30,000-lb capacity for stock up to ¼ in. thickness, have been announced by *Steel City Testing Laboratory*, 8843 Livernois Ave., Detroit 4. The permanent head is piloted to the main cylinder body which provides for the upper grip held in the head and the one



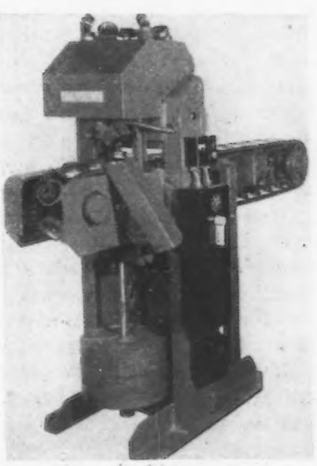
mounted on the piston being always completely concentric and for the penetrator starting the cupping at the exact center of the opening of the grip. Another advantage of the multiple piston construction of these machines is that the specimen is automatically held between the grips with a load in proper proportion to the one being applied in forming the cup. The load is applied automatically and uniformly to the specimen when the control valve is closed, followed immediately by the penetrator forming the cup. Cupping tools and dies are supplied to suit the various thickness of stock.

Coil Tester

DESIGNED for routine factory testing of coils and also for laboratory development testing, a magneto coil tester which gives a high-potential running test to six coils simultaneously, has been announced by the *General Electric Co.*, Schenectady 5. The upper grounded electrode of each of the six spark gaps, in the soundproofed ventilated compartment at the top of the tester, is attached to a threaded, knobbed rod which is used to make adjustments. Standing next to the rod is a scale calibrated from 10 to 45 kv. The control panel consists of filament and power switches, an overload circuit breaker, and two tap switches giving 2 pct steps in input voltage. A frequency switch provides five steps from 100 to 500 sparks per sec, and individual disconnecting switches are provided for each coil. The coil compartment is below the control panel.

Engine-Mount Tester

INSPECTION of engine-mounts for the automotive industry, to maintain close specification limits, is possible with the automatic,



power-operated testing machine developed and built by the *Link Engineering Co.*, 13845 Elmira Ave., Detroit 27. The machine is spe-

cifically fitted for motor mounts, but can be adapted to the testing of springs, clutch assemblies, and other resilient products or assemblies. This tester, driven by a ¾ hp motor, has an endless chain with receptacles for positioning the parts with a means of advancing the chain at 3 sec intervals bringing the parts in turn under the test station. A cam arrangement lowers specified dead-weight load on part, maintains the load for 1½ sec and then lifts it clear. A preset control arrangement checks compressed height limits reached under specified load and a delayed-action solenoid picks up and drops into a chute any parts which fail to meet the set specification. The machine is designed to test 20 mounts per min.

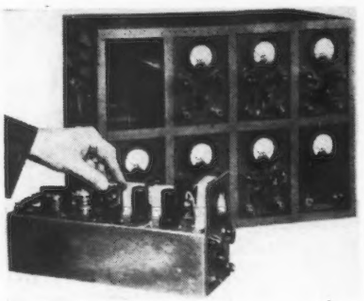
Frequency Meter

AN electronic A-F frequency meter, a device for measuring the frequency of ac voltages over the entire audible frequency spectrum, has been announced by *Communication Measurements Laboratory*, 120 Greenwich St., New York

6. In conjunction with a photobeam converter, Model 1800 becomes an electronic tachometer for measuring the speed of rotating or reciprocal mechanism. Speeds in excess of one million rpm or cpm can be measured with this instrument, it is claimed. It can also be used to measure relatively slow speeds in the order of 60 rpm or cpm, by means of a special frequency-multiplying disk or similar device. The frequency of positive or negative radar-type pulses from a fraction of a micro-second to more than 50 micro-seconds in duration can also be measured with this device, it is said. A separate input jack is provided for pulse operation.

Strain-Gage Amplifier

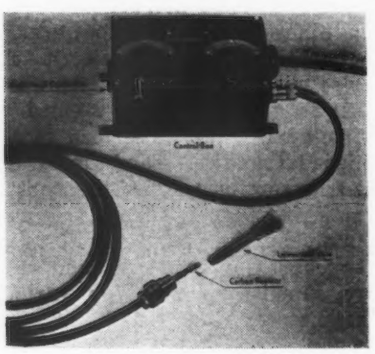
OPERATED in conjunction with either a magnetic oscillograph or a cathode ray oscilloscope, a strain-gage amplifier designed for use with resistance-wire, electromagnetic and magneto-strictive strain gages for amplifying small electric signals varying in frequencies from 0 to 1000 cycles per sec, has been announced by the *General Electric Co.*, Schenectady 5. This



small, lightweight instrument is suitable for aircraft flight-testing applications, as well as for use in development and testing laboratories and production shops. Available for use on 115-v, 60-cycle ac or for battery operation at 24 v, the amplifier consists of a 5000-cycle oscillator unit, a power unit, and either two or six identical amplifier units, all mounted in separate chassis in a sturdy case. The amplifier channels are stabilized against line voltage change or variations in tube characteristics, and each can be removed for servicing and inspection.

Temperature Compensator

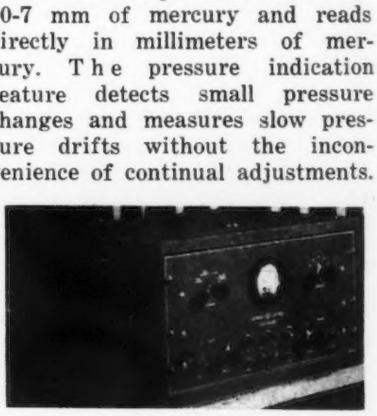
TO provide accurate continuous gaging of strip material rolled on a cold reduction mill, *Pratt & Whitney, Div. Niles-Bement-Pond Co.*, West Hartford, Conn., has announced a temperature compensator to maintain zero setting for all conditions of temperature. The com-



pensator can be applied to any P&W Electrolimit continuous gage and installed in about 10 min, it is said. The only mechanical change on the gage is to replace the existing lower roll stud with the temperature compensator roll stud. The use of the compensator eliminates the necessity of constantly checking the continuous gage with feeler gages during rolling, and provides an automatic means of indicating gage thickness under varying temperature conditions.

Ion Gage

TO measure or monitor continuously the highest vacuums ordinarily encountered in factory or laboratory processes an ion gage has been announced by the *General Electric Co.*, Schenectady 5. Consisting essentially of a control unit and an ion gage tube, the equipment measures pressures as low as 10-7 mm of mercury and reads directly in millimeters of mercury. The pressure indication feature detects small pressure changes and measures slow pressure drifts without the inconvenience of continual adjustments.



A protective circuit turns off the gage tube filament automatically at pressures above 10-4 mm. The control regulates filament emission against line voltage and pressure changes, assuring stable and accurate operation. The ion gage control unit includes the emission regulator circuit, a stabilized voltage supply, and electronic microammeter with indicating instrument, and the filament protective relay. The front panel contains all controls necessary for operation of the gage.

Streamlined Gages

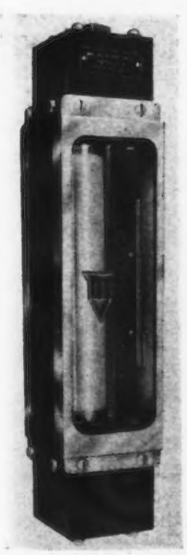
LONGER life under adverse conditions is claimed for a line of streamlined gages of modernized design announced by the *U. S. Gauge Div.* of *American Machine & Metals, Inc.*, 233 Broadway, New York. These gages are said to be superior in construction, appearance, and readability, retaining the precision of the company's products. The gages are fashioned with neutral gray cases, heightened by an ivory-toned dial with contrasting red and black graduations.

Pressure Gage

A BELLOWS-TYPE low range pressure gage suitable for indicating draft pressures or any low pressures of gases or liquids that are not corrosive to bronze has been developed by *Manning, Maxwell & Moore*, Bridgeport 2. The pressure element is a self-draining bronze bellows with a phosphor bronze calibration spring. Adjustable stops protect the bellows from excess pressure or vacuum. It is supplied in 4½ and 6-in. phenol cases with ¼-in. male pipe thread lower or back connection. Type 1188 P is supplied in pressure ranges from 10 in. of water up to 10 lb pressure. A low range vacuum gage ranges from 10 in. of water up to 20 in. of mercury vacuum.

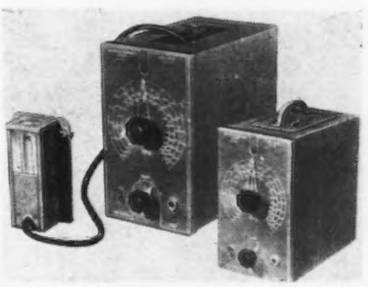
Full-View Rotameter

A FLOW rate measurement and control device, the full-view rotameter, has been designed by *Brooks Rotameter Co.*, P. O. Box B-1212, Lansdale, Pa. This instrument is equipped with an interchangeable precision metering tube which can be replaced without taking the meter out of the line. The wide space between side plates affords easy and accurate reading, even from an angle, it is claimed. Meter parts are treated to prevent external corrosion. The meter is safety-shielded with a full, leak-proof enclosure and is available in sizes from ⅛ to 4 in. with screwed or flanged connections. With a metal tapered tube, it can be used for pressures as high as 600 psi. This meter can be obtained as a simple flow rate indicator or with remote instrument for recording, or recording-controlled flow rate. Flow totalization can also be included.



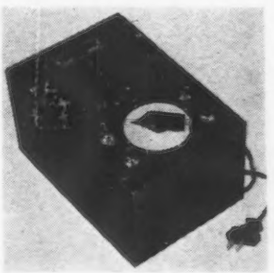
Portable Stroboscope

EMPLOYING a self-blocking circuit, a portable stroboscope, designed for the slow-motion study of rotating, reciprocating, or vibratory mechanisms, and for studying mechanical stresses and strains under dynamic conditions, has been announced by the *Communication Measurements Laboratory*, 120 Greenwich St., New York 6. Rotary or vibratory motion can be stopped when the moving object is examined with stroboscopic light source. The speed covered is from 600 to 48,000 rpm, in four ranges. A synchronized reed is provided for calibration against the line frequency. All four scales can be calibrated within ± 3 pct, it is said. The light source is contained in a probe attached to a 4-ft flexible cable, making possible the use of the stroboscopic light in small out-of-the-way places.



Process Timer

DESIGNED for single actuation as well as for sequence timing and recycling in continuous operation, an adjustable timing relay with immediate automatic resetting for timing periods from 1/20 sec on, has been announced by *Photovolt Corp.*, 95 Madison Ave., New York 16. The function of the electronic process timer is to close or to open an electrical circuit for an adjustable time interval. It is designed to control industrial processes and is said to deliver accurate and dependable performance. The preferred field of application of the timer is the timing of short intervals such as a few seconds or fractions of a second, where timers incorporating clock-work or motor are not sufficiently accurate due to the inertia of their mechanically moving parts and to the time lag of their friction clutches. The instrument incorporates no mechanically moving parts, except a rugged and fast-acting relay which has a life expectancy, it is said, of many millions of operations.

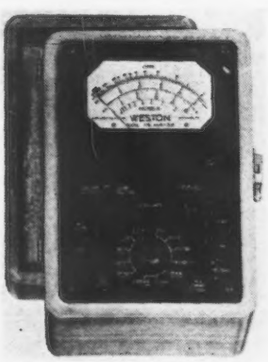


Tube Testing Press

ANNOUNCEMENT of a 25-ton hydraulic tube testing press has been made by the *Beatty Machine & Mfg. Co.*, Hammond, Ind. This unit is designed for testing tubes up to 3¼ in. ID and 48 in. long at 4800 psi, hydrostatic internal pressure, but within limitations of its pressing and space capacities, can be used for other diameters and lengths with the proper ram attachments.

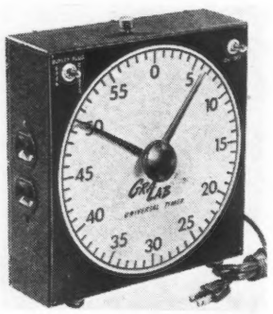
Electronic Analyzer

A PRECISION-BUILT supersensitive analyzer, compact and lightweight, yet said to provide complete range coverage, has been announced by the *Weston Electrical Instrument Corp.*, 620 Frelinghuysen Ave., Newark 5, N. J. This model 779, measuring only 6⅜ x 9⅛ x 4⅞ in., has five overlapping ac and dc voltage ranges, seven dc current ranges, four dc resistance ranges, and five decibel ranges. Each range has been selected for maximum adaptability to all requirements of electronic testing maintenance. Each dc voltage range is available at a dual sensitivity of 1000 or 20,000 ohms per v.



Universal Timer

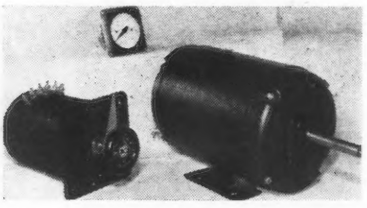
COMBINING both second and minute timing, up to 1 hr, a universal timer has been developed



by *Gray Laboratory & Mfg. Co.*, 43 W. Apple St., Dayton 2, for test operations which must be timed, and for precise laboratory timing operations. This precision instrument controlled by a selector switch will either make or break circuit at the expiration of the preselected time. The double outlet plug will operate two appliances simultaneously. An 8-in. aluminum dial, second and minute hands are easily visible in semidarkness, and a signal alarm is available for total-darkness use. The timer can be placed upright, laid flat, or hung on the wall.

Remote Indication System

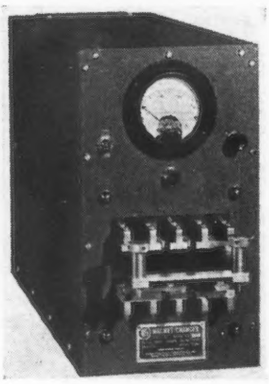
DC positioning and indicating equipment which can be operated from any ac or dc line has been announced by the *Allis-Chalmers Mfg. Co.*, 1945 Ristow St., Milwaukee 1, for general industrial use wherever remote indication and control systems are employed. This equipment, consisting of receivers and transmit-



ters, has been developed for use in oil fields, steel mills, steam or hydroelectric plants, and on shipboard. Immediate receiver response without hunting or overshooting is said to be attained over the entire operating range of the system. The transmitter, which is essentially a variable resistance bridge, operated manually or automatically, controls the relative strength of the receiver magnetic fields. Receiver and transmitter torques are independent and the receiver torque required to move a device has no effect on the transmitter. The transmitter is designed to operate any number of receivers within rated capacity at any specified direct current voltage. Six sizes available range from 5 oz in. to 360 lb in. approximate pullout torque.

Portable Magnet Charger

PRODUCTION of a magnet charger said to be capable of charging practically all permanent magnets has been announced by the *Radio Frequency Laboratories, Inc.*, Boonton, N. J. This model 107 is designed for use in production lines, instrument repair shops and laboratories. It contains a



large capacity condenser, an associated power pack and a current transformer through which the condenser bank is discharged. The storage condenser bank has a capacity of 100 mf and is charged to approximately 500 v. When the ignitron type tube which controls the condenser charge is fired the condenser discharges in a small fraction of a second, it is said, producing a high current surge in the charging bar exceeding 15,000 amp peak value.

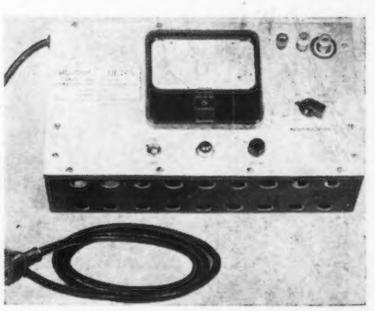
Pipe Locator

MODEL 112 pipe locator, announced by *Nilsson Electrical Laboratory, Inc.*, 103 Lafayette St., New York 13, consists of a transmitter unit and a receiver unit. The transmitter unit supplies a test signal to the pipe or conduit, and remains stationary, while the receiver, consisting of an internal pickup coil and battery-operated three stage amplifier, delivers its output into headphones. The pipe is traced by the signal picked up in its vicinity. When a test signal has been established the receiver is carried vertically and as the pipe is approached the signal increases to a maximum when the receiver is directly over and parallel to the

pipe. The location of the pipe may be traced by the variation in signal strength. To determine the exact location of the pipe at a given point the receiver is held horizontally, close to the ground and swayed back and forth over the pipe. Where the signal is weakest or inaudible, the pipe is directly under the center of the case.

Megohm Meter

STABILITY, portability, and a range from 400,000 ohms to 100,000 megohms in five ranges on a single scale 4-in. meter, are among the features of the model 1500 megohm meter, developed by *Communication Measurements Laboratory*, 120 Greenwich St., New York 6. This unit offers protection against atmospheric conditions where precise testing is required. Accuracy is said to be within 5 pct at any position on all ranges.



Weighing only 8 lb, model 1500 may be employed in laboratories or on production lines where it is necessary to measure and test in widely scattered locations. It can be used to measure leakage resistance of insulation materials, condensers, coaxial cables, wiring harness, motor and transformer windings.

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Assembly Line . . .

WALTER G. PATTON

• Both auto unions and management have acute financial pains . . . Cost-of-living wage rise discussed with union heads . . . Whitewalls are fast selling accessory.

DETROIT—True prophets are generally ignored and last week was no exception so far as the automobile industry is concerned.

Replying to the recent UAW-CIO invitation to discuss the basic reasons for the curtailed output by the automobile industry, George T. Christopher wrote: "The Packard meeting we suggest might be helpful . . . to both parties, as limited operations reduce both our incomes below the point where we can afford to stay in business."

The point Mr. Christopher had attempted to make a week ago was almost completely overlooked until this week when events served to give it well-deserved attention.

Reporting to the executive committee of the UAW-CIO, George F. Addes, secretary-treasurer disclosed that the union is currently operating at a deficit of about $70,000 per month and has less than $100,000 cash on hand. Chief reason for the deficit he explained was that dues-paying members have not increased at the rate anticipated. His report showed that members now number 696,000 as compared with a wartime peak of 1,245,000. It was further disclosed that last April the union was running in the red at the rate of about $150,000 per month.

Meanwhile, it was indicated that about 200 organizers have been taken off the union payrolls since the union's last convention and it is now reported that further reductions in the organization staff will be necessary if the union is to wipe out its present operating deficit. There are now about 300 organizers on the international staff whose yearly salary and expenses average about $6500; thus a reduction of 100 organizers would save the union about $650,000 a year. However, even before the new layoffs were started former organizers were stalking the union demanding job seniority and more "job security."

HOLDERS of automotive stocks have also been made acutely aware of the present financial shortcomings of the automobile industry resulting from low levels of production and increased costs of making automobiles. Cash dividends paid to holders of passenger car, truck and accessory manufacturers whose stocks are listed on the New York Stock Exchange, totaled $86,726,000 during the first 6 months of this year, compared with $100,747,000 in the corresponding period of last year, a reduction of 13.9 pct.

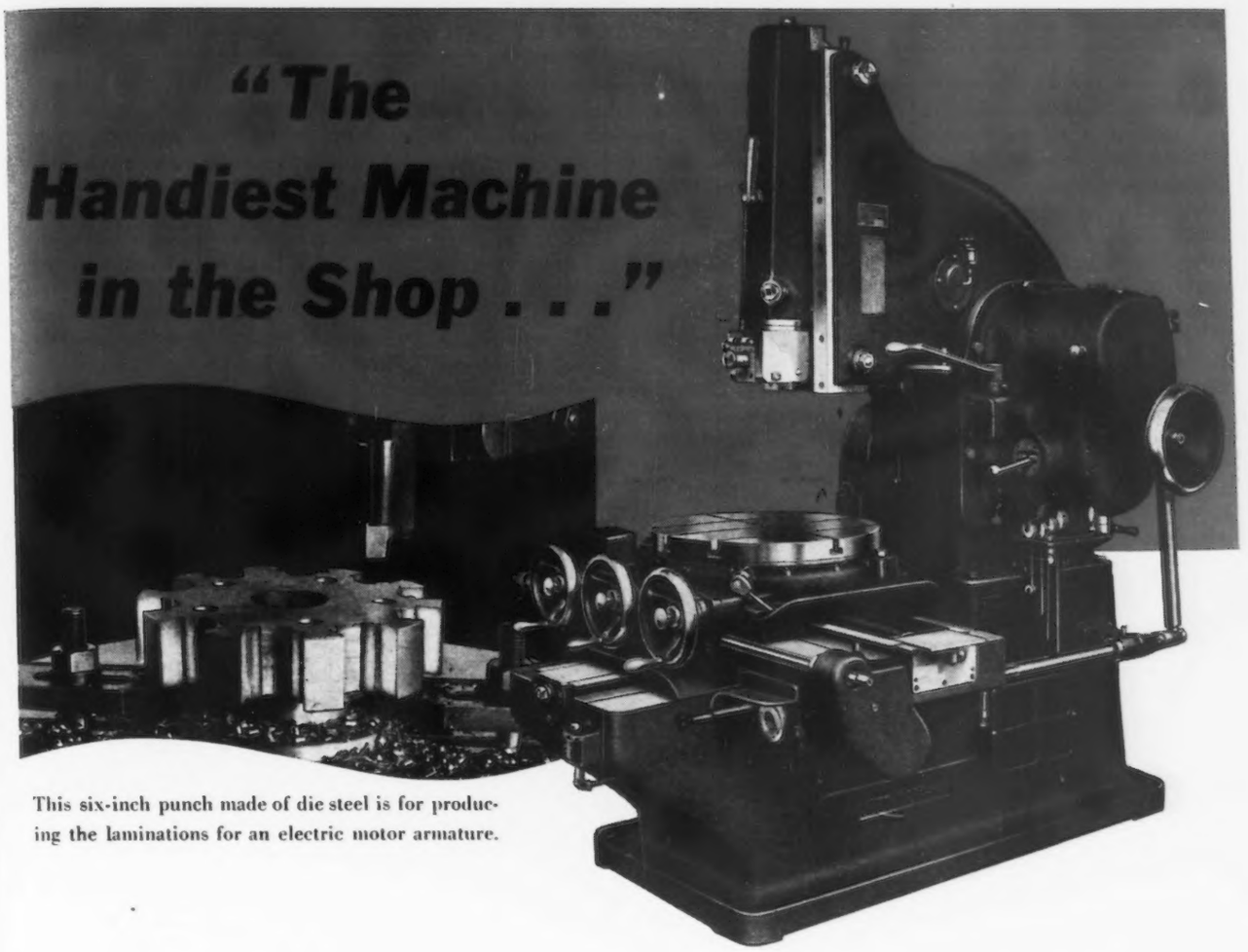
Chrysler offers an example of what is currently happening to earnings of automobile producers. During the first six months of 1946 Chrysler had the best production record as compared with the corresponding period of 1941 of any major producer. In his report to stockholders, President K. T. Keller disclosed that net profit for the corporation was $4,065,382, equivalent to 93¢ a share. For the corresponding period of last year, net profit was $17,326,834 or $3.98 a share. Mr. Keller explained that, except for tax adjustments and charges to previously created reserves, the corporation's operation would have shown a loss of $5,210,214 in the first six months of this year.

Included in the Chrysler report was this gloomy forecast: "There seems to be no prospect that our operations in the immediate foreseeable future will be conducted under conditions that could properly be described as normal."

In view of the recent Chrysler earnings record, it will be interesting to follow developments in the present demand by the Chrysler local for a direct wage increase or cost-of-living bonus equal to the rise in prices since June 30. Assuming that a bonus is to be tied to the cost-of-living, is this arrangement going to be reversible and thus give manufacturers a lever by which they could force down wages at some future time when prices go down?

Earlier indications were that the questions of wages and prices raised by the union would be left for settlement by the CIO policy conference which meets in Washington on Aug. 15. However, the local has insisted that something be done and Norman R. Matthews, national Chrysler director for the UAW, planned to appear at the current board sessions in Detroit this week to urge new wage negotiations with Chrysler. Unlike the GM and Ford contracts, the wage question at Chrysler may be reopened on 60 days' notice to the company. In addition to the wage demands, the union is asking an end to alleged speedup conditions in Chrysler plants; elimination of unsatisfactory working conditions; and vacation pay for returned war veterans on the same basis as other workers.

SOONER or later the automobile industry and the unions will have to face the problem of worker productivity and if indications this week are any criterion the prospects for an early showdown are promising. One producer who attempted to increase his plant production rate found that every second body was coming through unfinished and is reported to have abandoned the idea, temporarily at least. It is also reported that in the plant of another manufacturer, workers arbitrarily take a 15-min rest period out of each hour. In another case where sufficient supplies were on hand to permit uninterrupted production, plant output was said to be 45 pct under the



This six-inch punch made of die steel is for producing the laminations for an electric motor armature.

Cutting irregularly shaped work is on the daily schedule of most every tool shop. One of the handiest machines to do this work is the Pratt & Whitney Vertical Shaper. On this machine any good machinist can finish these special jobs quickly and accurately, often without a single time-killing change in setup. Its vertical construction makes possible three outstanding features: increased strength assuring permanent accuracy; hand and power rotary feeds to the table; and better observation of work progress.

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1941 level. It is agreed by most observers here that this result is not typical of worker productivity.

However, reports of abnormal absenteeism and high labor turnover among plant workers have recently been referred to by several automotive producers as a major contributing factor in the present low output of motor cars.

In his report to stockholders, Dr. Willard H. Dow, president of Dow Chemical Co., has indicated that the automobile industry is not alone with this problem. A letter accompanying the firm's 49th annual report, said that "manpower in general is at about the lowest efficiency it has ever been."

"As long as we continue to talk and think in terms of raising wages in order to meet higher costs of living, nothing can stop the continually ascending spiral of inflation," Dr. Dow said.

Dow called inflation "a symptom of human desire not to work and produce," and said it may be checked only through a widespread improvement in labor efficiency.

Getting away from financial statements and the low productivity of industrial workers, it is interesting to note that the fastest selling accessory in the motor field today has nothing to do with the functioning of a motor car and merely adds a note of beauty and attractiveness to the wheels. Moreover, whitewalls are being sold in huge quantities to new car buyers, testifying to the popular appeal of this comparatively new automobile accessory.

Reference is made, of course, to the attractive white trim rings seen on the wheels of many motor cars today. Metallic whitewalls are equipped with metal fingers which snap on the rim of the wheel. Plastic whitewalls are attached to the wheels between the hub cap and the tire.

Of particular interest to the steel industry is the fact that whitewalls are made both of plastic and metal by the same company, Lyon Mfg. Co., Detroit. The deluxe model, available only in metal, has an added chromium-plated ring.

Whitewalls were first introduced during 1941 but were withdrawn from the market during the war. They were reintroduced after VJ-Day and up to the present time more than a million have been sold. Peak production reached 11,000 sets per day or 44,000 units, but scarcity of both steel and plastic has reduced present production to a mere trickle. It is expected, however, that large-scale output will be resumed as soon as materials again become available. The metal discs are made from 0.015 steel; weight of a set is approximately 4 lb 9 oz.

AS interesting as the new accessory is its inventor, George Albert Lyon, president of Lyon, Inc., who also happens to be America's second most prolific inventor, ranking next to Thos. A. Edison. Up to the present time, the U. S. Patent Office has issued 1486 patents to Bert Lyon over a period of 40 yr. Lyon is said to be the maker of the first bumpers for autos; he invented the nonskid tread for tires and hundreds of other automobile accessories, most of which contribute something to automobile wheels.

A unique feature of Lyon's operations is the fact that he has never manufactured anything he didn't invent himself and that he never produces an item that performs a functional part on a motor car.

Having attained an age when most executives think about retiring, Lyon is as active today as ever and spends most of his time at a drawing board sketching new accessories for motor cars. Between inventions, he finds time to indulge in his many recreational pursuits which include roller skating, hunting moose with a bow and arrow and deep sea fishing. All of which may explain how the new plastic building being erected at Lyon, Inc., happens to have a skating rink on the roof!

Correction: A regrettable error occurred in reporting a change of gear steels in the July 11 "Assembly Line." The steel being replaced is SAE 5135 instead of 6135 and the operation which is expected to be eliminated is a lapping rather than a gear shaving operation.

New Research Service Set Up for Smaller Plants in Detroit Area

Detroit

• • • **A new science service is being offered to Detroit industrial plants, particularly those without their own research development staffs, according to an announcement by L. M. Patrick, director of the Wayne Engineering Research Institute. Founded and operated successfully during the war, the institute is at present using the laboratories of Wayne University. Members of the Wayne faculty act as consultants and project engineers augmenting the present institute staff.**

The new organization operates as a non-profit organization with the approval and support of the Wayne University administration.

Among the advantages claimed by the new research setup are a diversified staff of scientific personnel, availability of a wide variety of laboratory facilities and ability to call on trained personnel in several fields of engineering where a research project would benefit from such consultation. An example would be the ability of the institute to call on metallurgists to recommend materials and electronic engineers to provide controls for new equipment designed by mechanical engineers.

In the field of aeronautical engineering, the institute is prepared to assume responsibility for development work in aerodynamics, airfoils, structures, engines and propellers, instruments, jet propulsion and other phases of development. Comparable detailed investigation can be performed in the fields of Civil Engineering, Mechanical Engineering, Engineering Mechanics, Engineering Drawing and Engineering Shop Practice, according to Mr. Patrick.

In addition to specialized engineering service, the institute furnishes general technical advice and services including translations of technical publications and compiles technical tables including those which require the use of large calculating machines and experienced operators.

At the present time in the city of Detroit there is no engineering service comparable to that offered by the Wayne Engineering Research Institute, and it is believed that a number of Detroit firms, particularly those without adequate research facilities, will take advantage of this service to carry on development work that might not otherwise be undertaken or would be placed with research centers located outside of Detroit.

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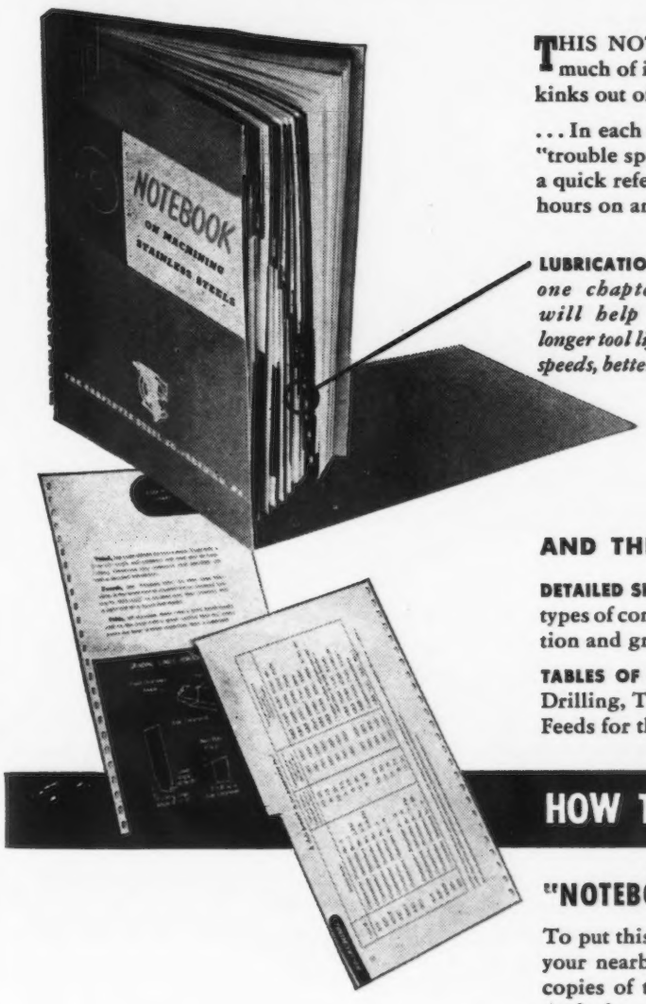

THIS NOTEBOOK contains pages and pages of useful information, much of it never before published! It gives many useful hints to take the kinks out of Stainless production jobs, reduce rejects and cut costs.

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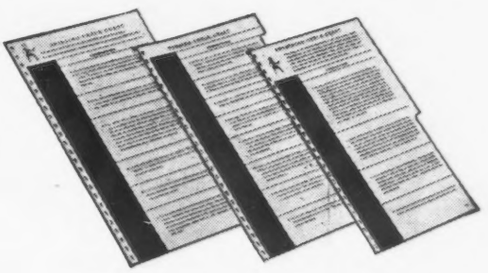

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DETAILED SKETCHES ON TOOL GRINDING—Angles and clearances for all types of common tools are described, along with detailed working information and grinding, stoning, lubrication, etc.

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Washington . . .

L. W. MOFFETT

• Moribund OWMR, given shot of adrenalin, to study guaranteed annual wage . . . Plan, still nebulous, looks to future labor - management contracts.

WASHINGTON — The Office of War Mobilization and Reconversion, recently given a new lease on life by President Truman after it had originally been scheduled for "demobilization" itself as having outlived its usefulness, has been given a new assignment. The chore: A comprehensive study of guaranteed wage plans.

Actually, the work is going on in two different places in addition to OWMR's overall study. The project itself was launched as a result of a request by the late President Roosevelt in March 1945 and both the Bureau of Labor Statistics and the Social Security Board have been gathering data on the subject, the former trying to determine how many and what kind of wage plans are in operation and the latter to unearth the cost of maintenance of such plans. The Guaranteed Wage Study Staff of OWMR is attempting to coordinate and analyze all the data gathered in order to determine what effects on national economy could be expected to result from adoption of such plans in different industries. Professors from Harvard and the Massachusetts Institute of Technology have been called in to assist.

Responsibility for OWMR's share of the work has been dropped into the lap of its Research Director, Murray W. Latimer, a former chairman of the Railroad Retirement Board. Routed from its quarters in the Barr Bldg. because professional men have insisted that some of the vast amounts of government-leased space be "reconverted to private use," Mr. Latimer and his staff of a dozen or so statisticians and analysts, clerks and typists have retired to the sixth floor of the Walker Bldg. on Fifteenth St., in the heart of Washington's "Little Wall Street." In this quiet haven, OWMR hopes the study group may be able to make sense out of conflicting statistics and come up with a workable plan for guaranteed wages which major industries may offer to their employees.

IN ITS seventh quarterly report, released under date of July 1, OWMR glowingly reports that the study is "making good progress" and that "work (is) well underway on five divisions of the study . . . as follows:

"(1) Examination of specific experience with guaranteed wage plans; (2) analysis of methods and possibilities of regularizing production and stabilization of employment; (3) inquiry on cost of various types of wage guarantees; (4) analysis of economic effects of guaranteed wages; and (5) examination of relation of guaranteed wage plans to other economic measures also intended to stabilize or increase national income."

The OWMR statement was slightly belated; at least, it contained nothing new. Apparently it was based largely on a memorandum written by Mr. Latimer to the Advisory Board nearly three months previously, under date of Apr. 15, and the extent of the "good progress" depends largely on how the phrase is defined.

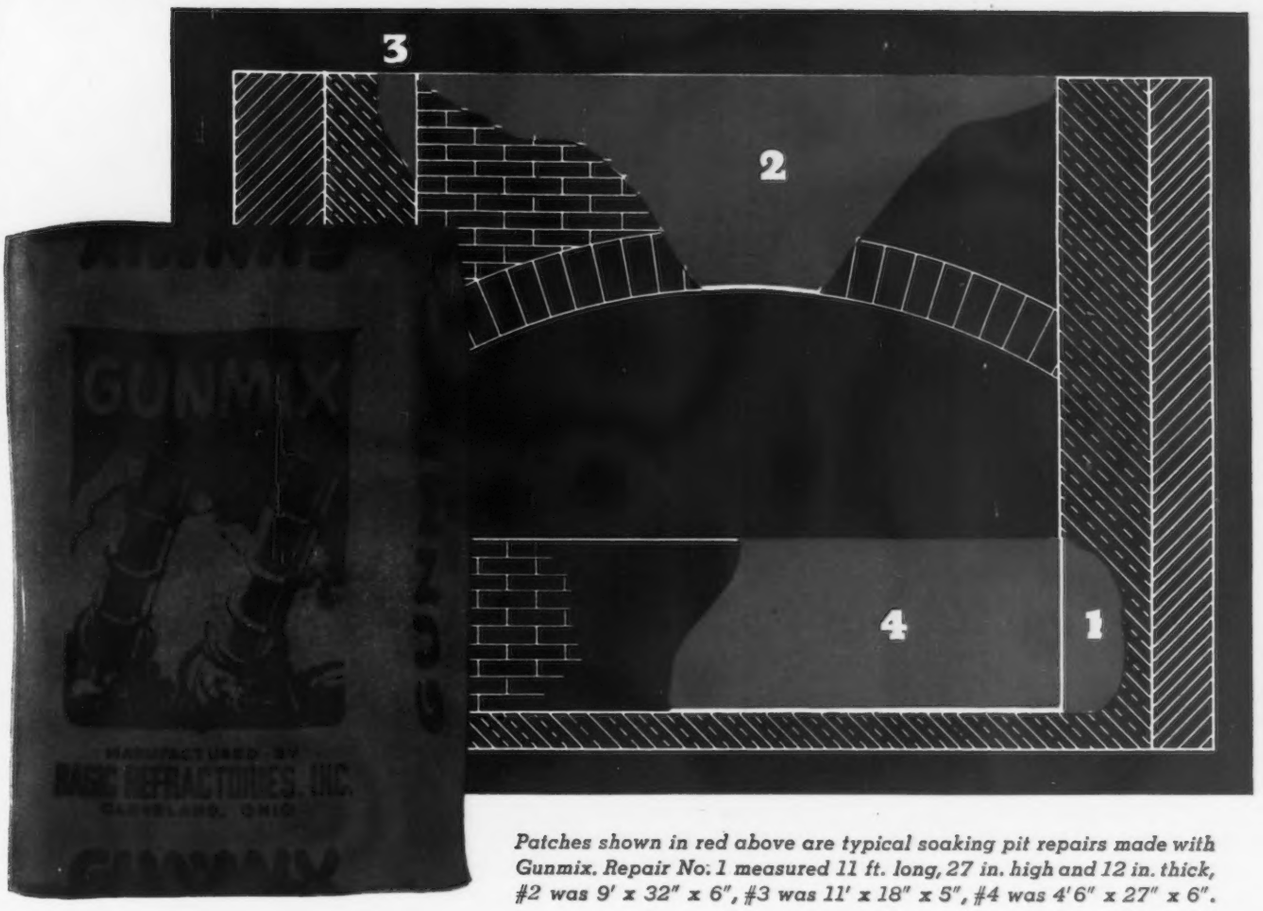
The memorandum stated that the BLS research had brought to surface a total of 275 plans "coming within the definition of a guaranteed wage plan employed by the study." This definition, for working purposes, is given as "an advance agreement between an employer and some or all of his nonexecutive employees which assures wages or employment for a period of not less than three months."

In the interim between the memorandum and the OWMR report, the 275 plans — which had been screened by the BLS from an original list of nearly 1500 establishments—had been further sifted down to a mere 60 which had potentialities worthy of additional study. These are now being studied by BLS with particular attention to labor turn-over, relation of production to sales, comparison of earnings levels between different plants, the attitude of labor, and why such plans were tried out at some plants and then discarded.

Admittedly, one of the biggest obstacles encountered so far by the Latimer group is the lack of complete statistics. Early in the study, it was confidently expected that the staff could plunge into a mass of government records and emerge with sufficient usable figures for its purposes. As Mr. Latimer should have learned from his experience with the RRB, many available government statistics are out-dated, out-moded, and virtually useless, having been compiled over different periods of time and being incomplete in one or more respects. As an example of obstacles encountered, records of the SSB do not show full-time annual wages of individuals, thus making it impossible to determine from them the relationship between full-time wages and guaranteed wage payments.

THIS has brought realization that a greater dependence will have to be placed on the cooperation of industry in obtaining workable figures. The Advisory Board is now engaged in a canvass of employers and employees interested in guaranteed wage plans and in the problems of regularizing employment and production. On the basis of this inquiry, it will be decided finally as to how to use the $200,000 appropriated by Congress for this purpose.

Industry as a whole has a considerable stake in the matter. Ad-



Patches shown in red above are typical soaking pit repairs made with Gunmix. Repair No. 1 measured 11 ft. long, 27 in. high and 12 in. thick, #2 was 9' x 32" x 6", #3 was 11' x 18" x 5", #4 was 4'6" x 27" x 6".

GUNMIX REPAIRS KEEP SOAKING PITS IN SERVICE

LAST spring, anticipating a halt of operations due to the impending rail strike, an Ohio steel company was doing everything possible to maintain peak production. Several soaking pits had been scheduled to shut down for badly needed rebuilds. But as a shutdown would seriously retard the flow of ingots to the mills, it was decided to keep the pits going as long as possible.

A quick repair job was done with Gunmix, applied with a large Gunmix Gun. Basic Refractories engineers made major repairs to two pits, each requiring well over a ton of Gunmix, with minor patches on copings, sidewalls and bridgewalls of several others.

Result—this steel plant lost almost no heating time, in spite of the previous bad condition of the pits. While thin patches in certain places on the silica sidewalls finally peeled off after four weeks' service, the thicker patches on claybrick copings and basic underwalls are still in place after three months of continuous use, now apparently a permanent part of the construction.

Gunmix has an excellent service record as a maintenance refractory for hot sidewalls in electric furnaces, as well as in soaking pits, metal mixers and other places where it is desirable to make quick repairs. Gunmix is designed for application with a high speed, mechanical gun, using airstream and water. If you are interested in a demonstration at your plant, just write or phone us.

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mittedly workers would be better satisfied if a larger number were assured year round jobs; plant operations would be more economical if production could be kept on a more even keel throughout the year. Some firms requiring two or three specialized workers in a scarce category, in order to protect themselves, sometimes single out these highly skilled artisans for special contracts which guarantee either work or pay in order to assure availability.

The annual wage idea has its supporters in labor ranks. For instance, shortly after his election as president of the UAW, Walter Reuther made a public statement advocating such a policy; on the other hand, other factions within the auto union have expressed opposition to the idea on the theory that such a policy must inevitably lead to cuts in wages.

This opposition is apparently based on the fact that automotive employment fluctuates from highs in winter-spring to lows in summer-fall. Presumably, manipulation of car prices would be involved in order to induce year-round buying, a theory bolstered by the experience of Packard Motors a few years ago when employment was made more stable by cutting car prices toward the end of each current model run.

NEVERTHELESS, the automobile industry is going ahead on its own, through appointment of an AMA committee to seek and recommend a solution to the problem, independent of government action. The steel industry likewise is going ahead with studies of the problem. Unlike the automotive industry, steel research and study is being carried out individually rather than collectively through a central group. Firms interested are making their own studies along the line of local problems although these should reveal many fields of similarity applicable on an industrywide basis.

Whether the government's wage study is to be broadened to include iron and steel is still a matter for speculation. On this, members of the board are not in agreement and Mr. Latimer has strongly advised against such a step.

"The demand for steel," he says, "arising as it does from a wide variety of industries, and in almost all cases at least two stages removed from consumer demand, will involve a tremendous amount of analysis. It is clear also that, in the past at least the demand for steel has, even apart from wartime demand, had tremendous variations. It seems improbable that a satisfactory study of this situation could be completed during 1946."

However, some of the board members continue to insist that a practicable plan for guaranteed wages in steel, as a widespread and basic industry, would go a long way in providing a model from which similar plans could be devised for related and other industries. In any event, a definite decision appears to be in no immediate prospect.

* * *

AN ARMY research and development program in molded plastic articles will soon be getting up full steam. High on the list is a study looking toward the development, formulation and design of adequate molded plastic military items to serve as a reservoir of substitute material for critical materials such as brass and tin in the event of a national emergency.

The following projects will also be among those covered in the program:

(1) The development of new types of materials and designs of crash, tropical and nonmagnetic helmets.

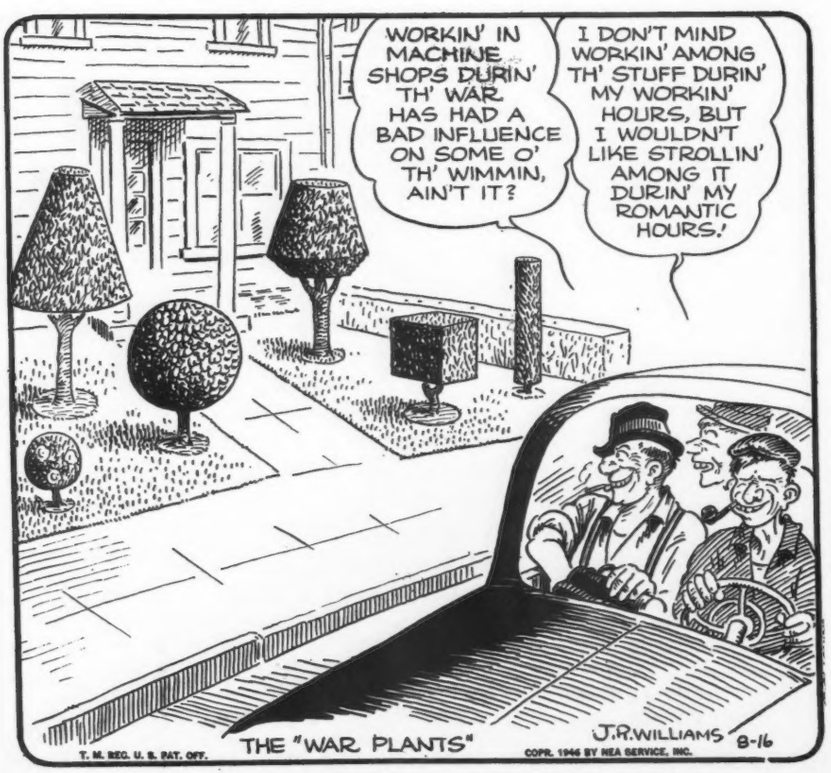
(2) Investigation of materials and design of molded plastic tableware and utensils to improve on existing items. The Army says that while the commercial items in this field are wholly satisfactory for civilian markets, they are entirely inadequate for military purposes.

(3) Indications from past research show that molded plastics can successfully replace metal and critical metal-coated material in the packages and containers for military emergency rations, according to Army reports. Considerable experimental work is projected along these lines.

* * *

THE Army's "canning program" for long-term storage of mobile combat equipment calls for the construction of almost 1200 55-ft diam and 274 29-ft diam sealed containers at estimated unit costs of $3600 and $2600 each.

THE BULL OF THE WOODS — BY J. R. WILLIAMS


WORKIN' IN MACHINE SHOPS DURIN' TH' WAR HAS HAD A BAD INFLUENCE ON SOME O' TH' WIMMIN, AIN'T IT?
I DON'T MIND WORKIN' AMONG TH' STUFF DURIN' MY WORKIN' HOURS, BUT I WOULDN'T LIKE STROLLIN' AMONG IT DURIN' MY ROMANTIC HOURS!
THE "WAR PLANTS"
J.R.WILLIAMS 8-16
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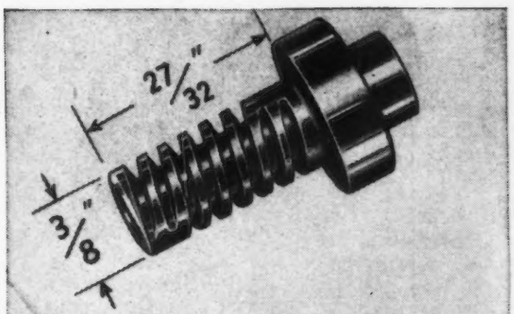
SHEFFIELD MACHINE TOOL DATA

TFG #121

CRUSH GRINDING MULTIPLE START WORMS
ON SHEFFIELD PRECISION THREAD AND FORM GRINDER



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PLUNGE GRIND IN 35 SECONDS

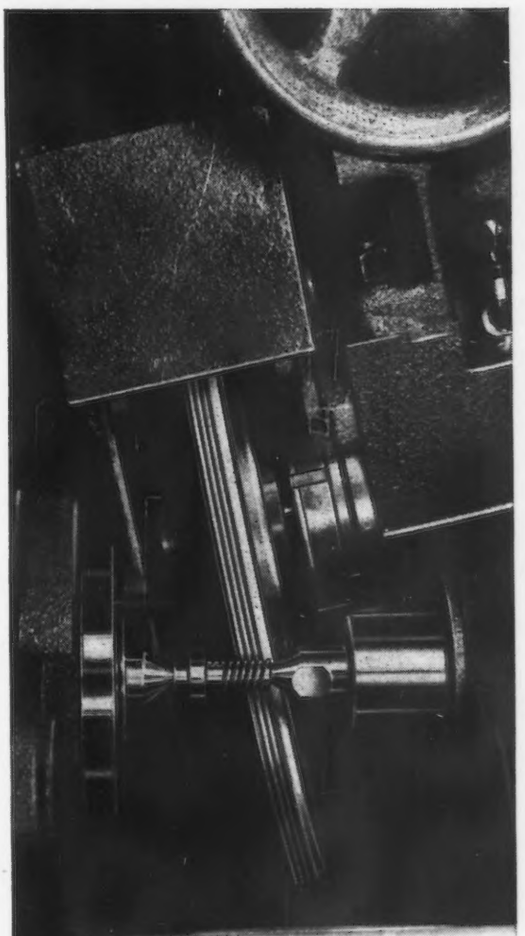
Multiple or single start worms can be quickly and economically produced by Crush Grinding with a Multi-Rib Wheel.

Evidence substantiating this statement is incorporated in the following case history.

The part illustrated is a double start 32 diametral pitch worm with conventional $14\frac{1}{2}^{\circ}$ pressure angle. Material is bronze. P.D. tolerance is to be held to .003 over wires. As practically all worms have clearance between the root and the mating worm wheel, a radius at the root presents no problem in assembly.

The multi-rib wheel, crush trued, was set at the required helix angle, 11° 26'. The wheel was briskly plunged to depth inside the outer center of the part so as not to cut through the thrust face. The cut was stopped close to the shoulder of the gear diameter to prevent the wheel marking the shoulder.

The grinding time of 35 seconds produced both starts simultaneously. Burrs usually produced in conventional thread milling are eliminated by crush grinding.



MACHINE SETUP TO GRIND DOUBLE START LEFT HAND WORM WITH CRUSH TRUED MULTIRIB WHEEL. HELIX ANGLE 11° 26'

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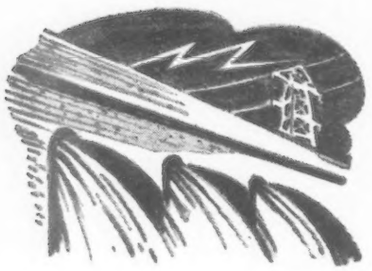
• In spite of labor shortages and inefficiency, and scarcity of materials, Seattle industries are increasing production and developing new products . . . Scrap getting tight, but not yet serious in Washington.



SEATTLE — "Crying on the Outside" while "Laughing on the Inside" doesn't adequately describe industrial conditions in this dynamic, courageous northwest city, but it does come close. The discrepancy is that while the "crying" about high labor costs, inefficiency of labor, material shortages and discrimination of eastern suppliers reaches a crescendo, underneath it all is an obvious and determined successful effort to beat these four horsemen in the battle for survival and progress.

Manufacturers of farm tractors, water heaters, trucks, airplanes and dog leashes all complain that their labor rates are higher than anywhere else in the country and that they can't get the motors, the steel or the aluminum to enable them to reach maximum scheduled production—but by careful and intelligent planning they are all producing, and producing at a profit.

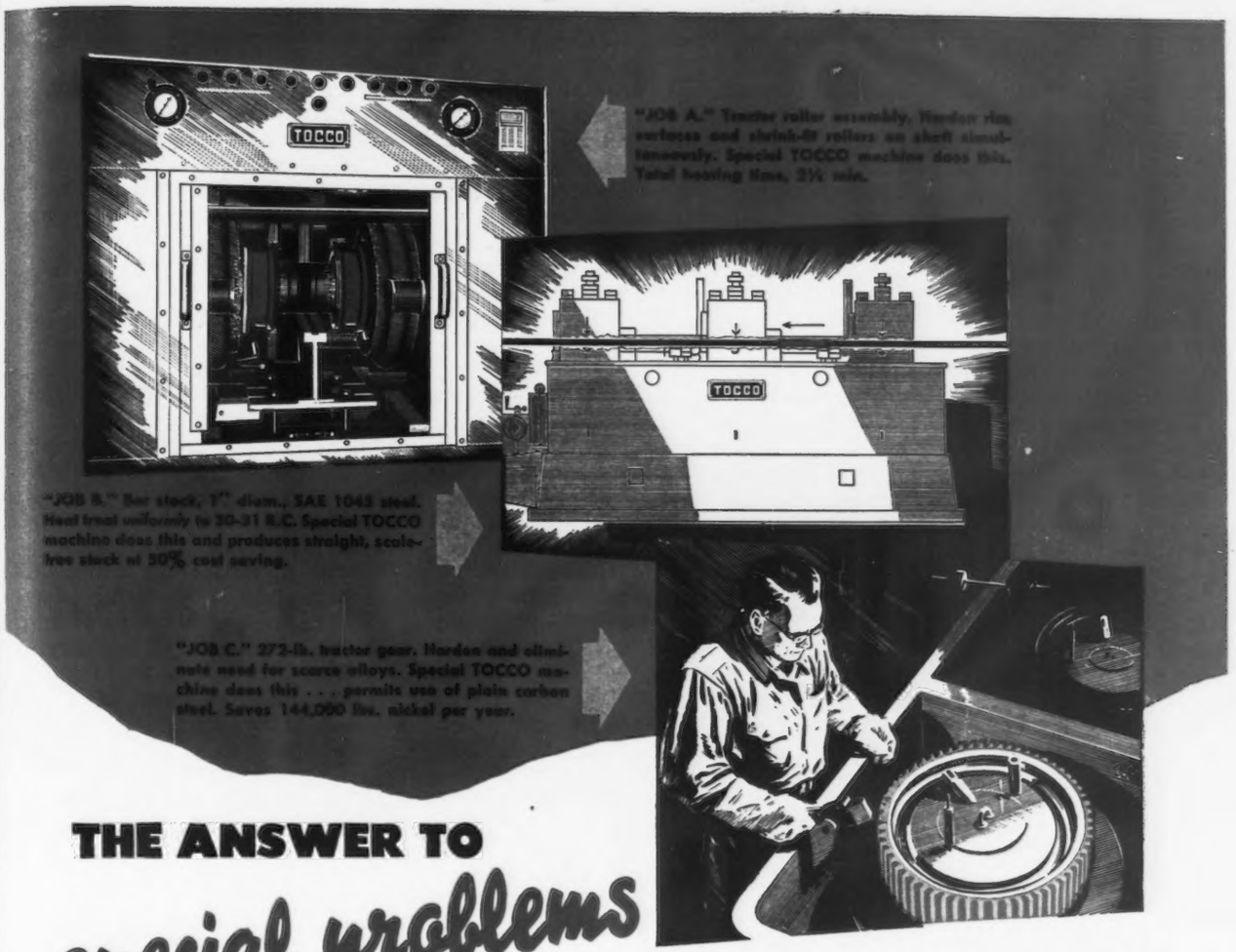
There is no question but that the Pacific Northwest is paying more for its labor than any other part of the country; no one doubts that steel sheets, aluminum extrusions and gasoline and electric motors are difficult to obtain; and that many other basic products are apparently more readily available east of the Rocky Mountains than out here; but in spite of these obvious handicaps, industry of the area is fighting its way ahead and making progress.

Boeing Aircraft Co., operating under a 15 pct labor cost handicap compared to California, and a 20 to 30 pct labor cost handicap compared to the rest of the country, continues to find ways and means of increasing its employment and staying in the business of manufacturing airplanes and selling them at a profit. Phenomenal success with its Stratocruiser, for which this organization now has orders for more than $60 million, hasn't grounded its efforts to seek new fields to conquer. Working with the Air Materiel Command of the Army Air Forces, the company has announced a Boeing supersonic guided missile said to be capable of destroying enemy aircraft or missiles which might threaten the United States in time of war. The research preceding the trials of this new defensive weapon has been under way for 15 months and it is anticipated that 60 of the missiles will be fired during the next year to provide the data necessary to determine the practicability of the weapon. For the technically minded, the first test missiles are propelled by standard aerojet rocket units. A booster power unit is attached to the tail of the pilotless aircraft, which accelerates the missile to supersonic speeds in a few seconds. Boeing is believed to be the only company in the United States doing the entire job of research, construction and test firing on such a project. A 30-man crew is at Wendover, Utah, doing actual testing. Other engineers are busy at the local plant perfecting details and improvements on the missile.

BOEING is also looking into the future to the extent of bringing off of its drawing boards a cargo ship known as the Stratofreighter—a double-deck, four-engine ship which will, according to the designers, operate at the unprecedented low direct cost of 3.9¢ per ton mile. The airplane has a carrying capacity twice that of an ordinary railroad boxcar in volume and is said to be capable of racing across the country 20 times while a boxcar is making one trip. Maximum load is reported to be 41,000 lb at speeds of 300 to 350 mph. Four 3500 hp Pratt & Whitney Wasp Major engines power the ship.

Twin-engine transports are also soon coming off the Boeing lines. Empire Air Lines signed a contract for $465,000 worth of the ships which will serve more than 20 communities in Idaho, Oregon and Washington. The three ships involved will be produced in the Wichita, Kan., division.

Western Gear Works, fighting for blanks and gear housings, is still looking ahead and probing the market for products which it can make and sell to advantage. When the United States Forest Service came along with a midget tractor it had developed to fight fires in this area, Western was quick to cooperate in production and refinement. The little track-type tractor will probably never be a volume product—it is sturdy and powerful with its 15 hp engine and 1800 lb weight and is not designed for low cost sales. But the "Beetle," as it is called by the Forest Service because it can get in and out of tight places in a hurry, should be a profitable machine because of the work it can do under conditions where any of its big brothers would be eliminated because of their size. Production plans are still under wraps, but it is understood that as soon as cast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gear cases and motors are available, Beetles will be rolling off the production line at a high rate. Other new and diverse products of this old-line company are being held up primarily because of the lack of availability of reasonably priced components. In line with other western manufacturers Western is looking into the possibilities of maintaining self-sufficiency by providing more of its semifinished and raw materials.

Kenworth Motor Truck Corp. is not permitting labor costs nor material shortages to interfere with carefully laid plans for the expansion of its markets for trucks and buses. Now in production in its new and modern plant on trucks of from 34,000 to 106,000 lb capacity, Kenworth is casting about for markets for its facilities to make buses for both the domestic and export market. With a healthy backlog of orders for heavy-duty trucks, Kenworth is in a position to enter the bus field with the odds in its favor. Completely set up to produce its own dies from mockups, this company is set up to handle almost any type of production in the automotive field.

Because of its international merchandising of smoking pipes, Kirsten Pipe Co. is one of the better known industrials of Seattle. Last week this company moved into its new plant which cost approximately one-half million dollars to remodel from a laundry into one of the most modern production units in the country. The popularity of its aluminum "radiator" smoking pipes, invented by a University of Washington professor, has overshadowed three other products of the company which, industrially, are considerably more important. From a prewar employment of 47 persons, Kirsten Pipe Co. has developed into a major industry of the area with 200 on the payroll producing not only the famed smoking pipe, but a photo-electric pilot, a remote control for shifting gears on marine engines and a turkey feather picker.

The apparent incongruity of this diverse production is understandable when it is made obvious that the same machine tools are utilized in the production of these products. George Gunn, Jr., president of the company, with his engineering background, has gone to considerable lengths to provide for efficient working conditions throughout the plant. Color engineering, provided by specialists, cleanliness and employee comfort facilities are evident everywhere. The reconditioned building has made possible the utilization of false ceilings for the placement of piping and exhaust ducts which adds to the efficiency and cleanliness of operations.

Material flow has been carefully worked out and the aluminum tubular extrusion provided by Alcoa move smoothly from stockpile to finished pipe with a minimum of handling and back-haul.

Another fabricator of aluminum has loomed up on the local horizon. The De W. Metal Tube Co. is producing an aluminum dog leash which resembles a riding crop equipped with a shock absorbing spring. A ½-in. aluminum tube about 3 ft long has a knob at the dog-handler's end and a swivel snap at the other. This basic design is varied to accommodate dogs of various heights so as to enable the handler to control any pooch without danger of entanglement. The inventor, William D. Payne, is already swamped with orders and expects to do a thriving business throughout the country.

THERE is considerable speculation as to when, and if, the Seidelhuber Iron & Bronze Works, Inc., will get started on the $3½ million steel plant it announced several weeks ago. Successful manufacturers of electric water heaters and ornamental iron and bronze, this company insists it will go into the production of steel sheets as self-protection to insure an adequate supply of this material. While company officials report that engineers have been hired to survey the practicability of such an operation in this territory, conservative elements in the industrial field here are willing to wager that the plant does not get into production.

Original statements from the company indicated that sheet bars would be produced in its own furnaces but latest reports are to the effect that efforts will first be made to purchase the bars or billets from local sources.

The question is, will local producers of steel have any to spare for the proposed rolling mill and if so, will they be willing to supply it to a potential competitor. A spokesman for the company frankly stated that the proposed mill is still in the "study" stage and decision to proceed must await final report of engineers and market studies.

That Seattle is serious in its efforts to find employment for every worker who wants it is indicated by an industrial survey now under way by the city and scheduled for completion within the next few months. Unemployment compensation claims are dropping in number, but approximately 11,000 persons are still drawing checks while staying away from jobs abundantly advertised in Seattle newspapers. Milling machine operators are being offered $1.63 an hr, turret lathe operators the same amount and tool and die makers, carbide tool men and boring machine operators are pleaded for at $1.70 an hr. Industrialists raise blood pressures when discussing availability of labor and productivity of men and women on the job. Some claim that productivity has dropped as much as 40 pct since VJ-Day in spite of better working conditions, shorter hours and higher hourly rates.

In addition to the other difficulties common to all industry, steel producers here are not optimistic about the scrap situation. While no serious shortage is apparent, deliveries from dealers are slow and there is considerable evidence that the principal difficulty is the limitations of the OPA prices. Dealers insist that they cannot afford to go out after scrap in outlying areas, pay its freight and preparation costs, and deliver it to consumers under present ceilings. Another factor in the tightening condition is the lack of agricultural equipment and automotive scrap. In general, however, there is the feeling that steel producers will be able to muddle through unless there are heavy shipments East before the special 66¢ per cwt expires on Aug. 23. It is said that about 100,000 tons of shipyard scrap moved out of the Portland area under the special rate, but that the Seattle area has not been drained for the East. While dealers state they believe the special rate is justified, there will apparently be no concerted effort by local operators to plead for its continuance at the Aug. 19 hearing in Chicago.

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Eaton Mfg. Co.
Reliance Division
Massillon, Ohio

The Lamson & Sessions Co.
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Manufacturers Screw Products
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National Lock Co.
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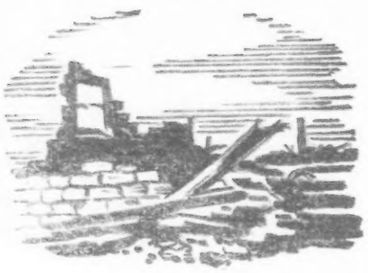
European Letter . . . JACK R. HIGHT

• Unification of American and British zones economically has Germany agog . . . American zone wants more steel . . . British zone needs food and consumer goods . . . First Farben sale promised to break the combine.



BERLIN—The introduction of a new monetary system for the American contingent in Berlin is the biggest news of the month. By tieing American mark buying direct to dollar payments, participation in the black market has dwindled off into nothing. I think that in place of the feverish "new rich" attitude that so horrified me early in the year there is beginning to be evident a new seriousness that promises much for the American administration of the future. Undoubtedly the arrival of the first contingents of family dependents has added a touch of reality to an otherwise highly artificial existence.

The city itself I found much more cheerful than when I left it a few weeks ago, or perhaps it was my state of mind on having so much sunshine to enjoy. Certainly the addition of some green foliage to the landscape has lessened the impact of the grim rubble, as far as a visitor is concerned. While the heat of the political struggle that was going on when I was last here has passed, the announcement by General McNarney regarding interzonal economic unity put all the best rumormongers at work again.

Actually the statement which he handed to the Four Power Control Council was no more than a too-precisely worded version of the earlier affirmations by Secretary of State Byrnes in Paris and Washington on the subject. The statement was a formal invitation from the U. S. government to any and all other occupying powers to immediately enter into negotiations to economically unify their respective zones. The official statement put it this way:

"The U. S. Government is of the view that no zone in Germany is self-sustaining. The treatment of two or more zones as an economic unit would improve conditions in the zones concerned.

"Therefore, the U. S. Government has authorized its representative on the Allied Control Council (for Germany) to join with the representatives of any other occupying power or powers in measures for the treatment of our respective zones as an economic unit, pending quadripartite agreement which would permit the application of the Potsdam decision to treat all of Germany as an economic unit so as to attain a balanced economy throughout Germany."

All of which is straightforward and to the point. At a press conference following the meeting of the control council, General McNarney refused to be drawn into much prognostication on the subject but threw one very interesting sidelight on the existing state of negotiations on the Four Power level. There was no official press release after the meeting as is the usual custom, because among other bits of business of note were the McNarney declarations. The press release was withheld because the Russians would not agree on how to word the statement that the American representative had made. There was more fatigue and resignation than irony in the General's tone as he explained patiently to newsmen that there were difficulties in saying the same thing in the two languages.

He made it fairly obvious that the negotiations for unifying one or more zones are already going on with the interested British authorities. He withheld comment on progress, however, and said that all the representatives on the council stated that they would refer the matter to their respective governments.

THERE is little doubt that some unification will be achieved in the Anglo-American sphere. As far as the French authorities are concerned, opinion here is that if the other powers agree to treat the Saar as separate from the French zone, then the French zone may well come into the agreement. As the General made it clear that all agreements would be open to new members whenever they chose to join, France might well delay her action, while the communist leaders in Paris get their wires from Moscow uncrossed. With due consideration for the geographic pattern of the three western zones, there would tend to be constantly increasing pressure for the French zone to cooperate with a unified American-British zone.

While the term "unification" is flying free and fast, there is in fact no plan for the immediate political unification. The American experts are pushing agreements for reduction of interzonal barriers in the fields of finance, transportation, communications, industry and foreign trade. The pressure from the British side is to achieve agreement on foreign trade and reduce the cost of her occupation.

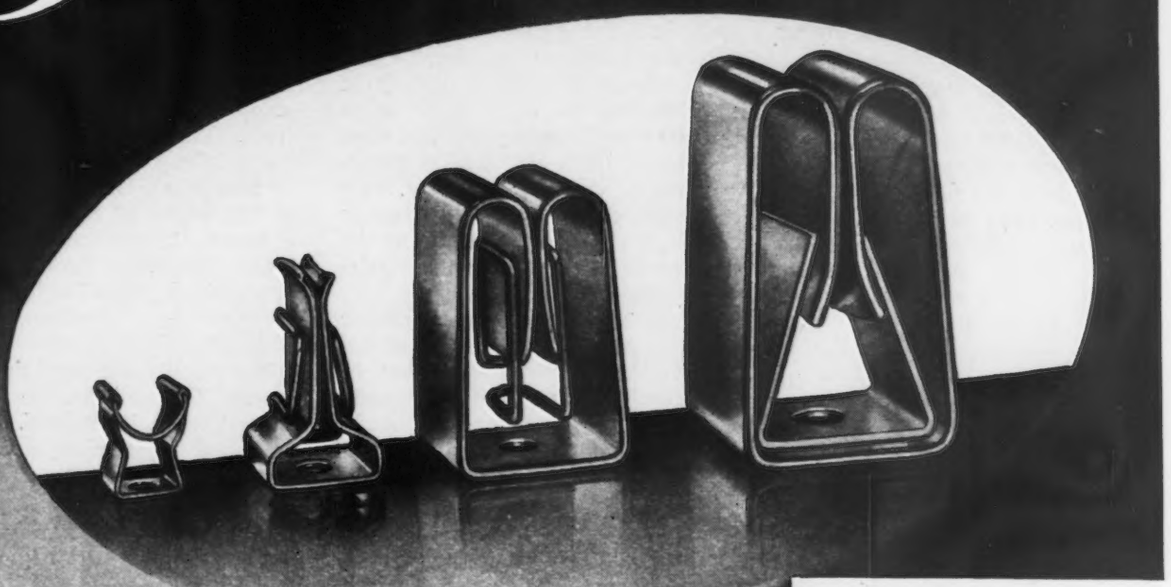
As far as the British occupation army officers are concerned, they are looking forward to the unification, and count on it for an increased food ration for the British zone. The freedom for movement of trade should make possible a general rise in the industrial index, and thus eventually a flow of consumer goods into the Ruhr.

* * *

POSSIBLY foreshadowing the economic unification of the British and American zones of Germany, a permanent U. S. liaison group is being established in the British zone, with headquarters in Essen. "Specialists in coal, steel and mining supplies" will be included in the group, according to American authorities here in Berlin.

Branch offices are also to be located in Dusseldorf, and in the Saar region in the French zone. Avowed purpose of the new offices will be to facilitate shipment of coal and steel which is allocated

Positive Pressure FUSE CLIPS

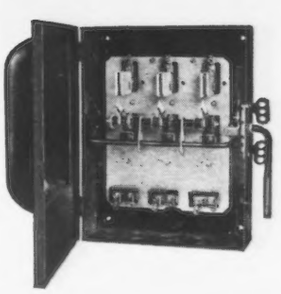


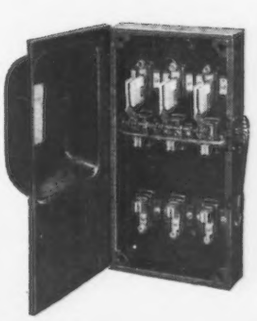
. . . an exclusive feature of all Square D Safety Switches

What do these fuse clips add to overall safety switch performance? Plenty!

- They reduce heating at contact points by 60%, compared with conventional type clips.
- Copper instead of bronze, they afford substantially more conductivity.
- Lower contact resistance because of higher contact pressure.
- Design permits easy insertion and removal of fuses, notwithstanding the higher contact pressure.
- The Positive Pressure is automatic. It requires no bolts or clamps. It is immune to the loosening effect of vibration, wear or thread stripping.

This is one of many basic features which have placed Square D safety switches in the number one preference spot.





Write for BULLETIN 500 which describes Square D's complete safety switch line and all its features. Address Square D Company, 6060 Rivard Street, Detroit 11, Michigan.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

to the American zone, and also the shipment of mining supplies and other equipment which is said to be going from the American zone into the Ruhr.

I personally carried the good news to the British steel authorities in Dusseldorf that they were to have on the spot American assistance, but the impact was damped as the British steel men are currently fighting a battle to retain office space in Dusseldorf themselves.

Col. Ellis F. Altman, who has been deputy chief of the industry branch of the economics division of U. S. military government in Berlin, will head the new office group. He is a veteran Army officer, with two years in the China-Burma-India theater of operations before being sent to Germany last year.

* * *

THE proverbial swords-plowshares theory is nearing its vindication in the American zone in southern Germany. The swords are not actually being used, as most were removed as souvenirs by wandering soldiers, "investigators," and editors, but the bulky armor plate that they reluctantly left behind as too heavy to move is being used. After a series of heat treatment operations 8 to 23 mm armor plate is being reclaimed for farm implement use.

Through arrangements made by the appropriate military government officials the firm Eberhardt Bros. of Ulm and the Forging and Hammer works of Karl Schneider at Aalen are engaged in the work. Plow points and plowshares are the principal items being forged. Most of the material being used was rusting in stockpiles at Mannheim, Ulm, Neckarsulm, and in other parts of Wuerttemberg-Baden.

* * *

BETWEEN 30 and 35 of the smaller properties of the I. G. Farbenindustrie in all zones, which can be operated independently without detriment to production, are to be sold in the open market. This step is another, if minor one, in the operations designed to break up what is described here as the world's largest chemical company.

James S. Martin, the U. S. control officer for Farben has stated that it is the American view that the present list of plants should go into private hands. In this connection, the official American view is that German government agencies should not be allowed to purchase large units of the Farben combine. The military government feels that large concentrations of economic power should not be placed in the hands of any German groups, either public or private.

Mr. Martin favors the diffusion of ownership and a drastic limitation on the amount of stock that can be held by individual shareholders. Purchase of stock by Farben employees is also to be limited, as the traditional loyalty of Farben help is thought to be so strong that if their purchases were unlimited there would be a regeneration of the Farben power. Presumably, certain classes of Farben employees and officials are to be denied the right to buy these saleable properties.

There is as yet no agreement on how the proceeds of the sale of the properties will be divided, but in the event that any of the proceeds are turned back to private hands the creditors will probably receive prior consideration before the stockholders.

Specific objectives of the seizure of the Farben combine included making Farben plants available for reparations, destroying certain plants utilized strictly for war purposes, decentralizing the management and dispersing the ownership of individual units, terminating interests in cartels and cartel-like arrangements, and preventing research for war purposes.

The first list of saleable products does not indicate the achievement of all those high-sounding objectives. This first group is composed only of those not affected by patent or trademark rights disputes, nor, in the words of the military government, "those affected by the larger decisions involved in the eventual decentralization of the principal I. G. Farben holdings." Although these plants represent only a small fraction of the Farben assets, the military government hopes that their disposal will set a precedent for further action.

U.K.-Belgian Groups Oppose Nationalization

London

• • • **Conversations have** taken place recently in Brussels between delegations representing the Federation of British Industries and the Federation of Belgian Industries. Representatives of leading industries on both sides, including chemicals, coal, engineering, iron and steel, motor cars and vehicles, and textiles, took part in the talks and continued contacts established in January, 1946, when a delegation of Belgian industrialists were the guests of the Federation of British Industries in London.

The British delegation gave an account of further nationalization plans which the British Government is contemplating, and the Belgian delegation reaffirmed their complete opposition to the principle of the nationalization of industry. The two delegations reiterated their conviction that private enterprise remained the best means of solving the great industrial economic problems of today.

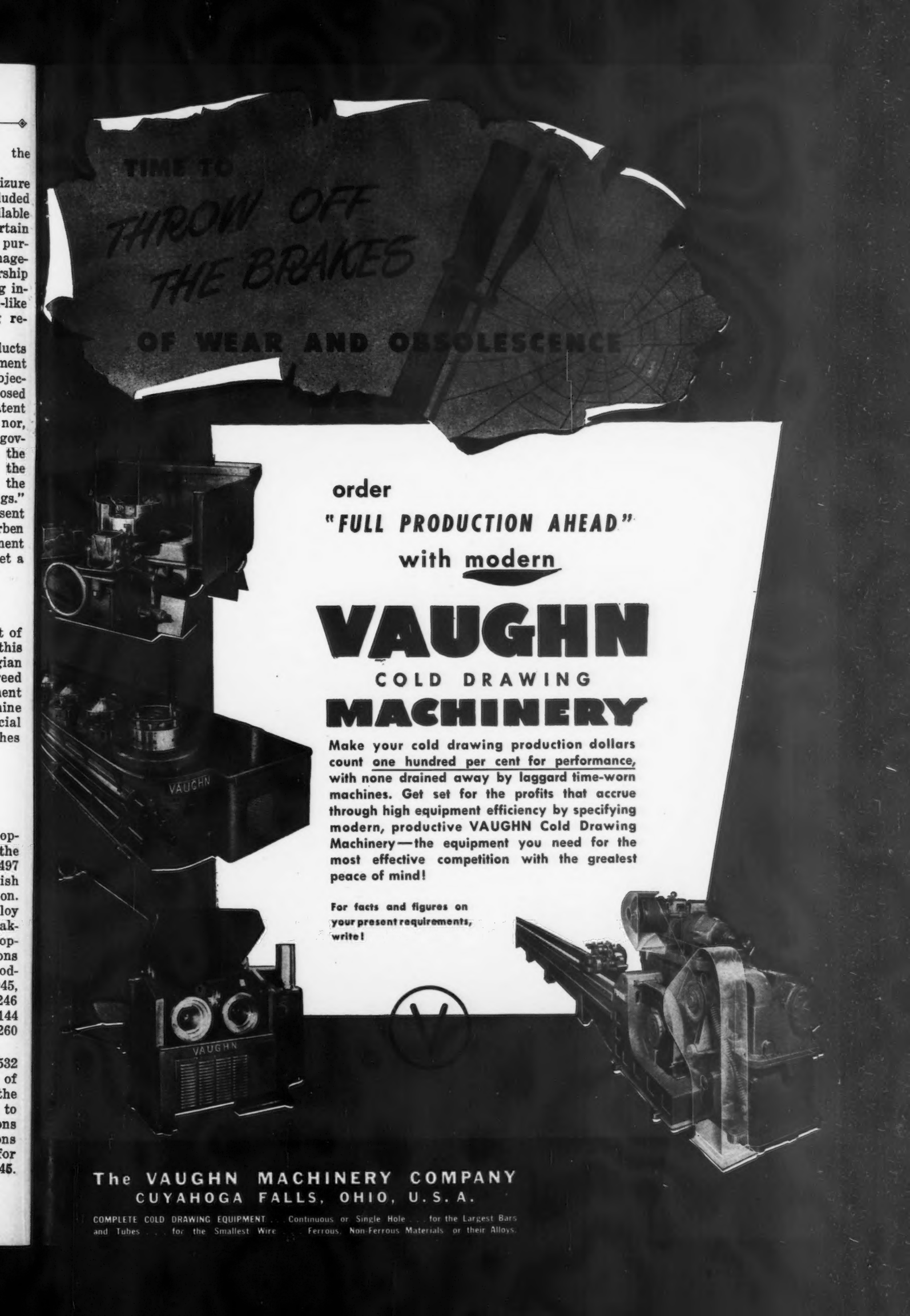
The attention of the British delegation was drawn to the present unbalanced state of Anglo-Belgian trade, to the detriment of Belgium. In order to remedy this and to expand Anglo-Belgian trade, the two delegations agreed to recommend the establishment of permanent bodies to examine the development of commercial trends in their respective branches of activity.

U.K. Copper Use Down

London

• • • **Consumption of** virgin copper in the United Kingdom for the first half of 1946 totaled 170,497 tons, according to the British Nonferrous Metals Federation. Copper content of copper and alloy scrap used was 86,788 tons, making a total of 257,286 tons of copper used to produce 334,902 tons of copper and copper alloy products. For the first half of 1945, 171,898 tons of copper and 117,246 tons of scrap, totaling 289,144 tons, was used to produce 287,260 tons.

June consumption was 26,532 tons of copper and 17,796 tons of scrap, bringing the totals for the second quarter of this year up to 87,091 tons copper and 45,830 tons scrap, compared with 81,063 tons copper and 57,947 tons scrap for the corresponding period of 1945.


TIME TO
THROW OFF
THE BRAKES
OF WEAR AND OBSOLESCENCE
order
"FULL PRODUCTION AHEAD"
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VAUGHN
COLD DRAWING
MACHINERY
Make your cold drawing production dollars count one hundred per cent for performance, with none drained away by laggard time-worn machines. Get set for the profits that accrue through high equipment efficiency by specifying modern, productive VAUGHN Cold Drawing Machinery—the equipment you need for the most effective competition with the greatest peace of mind!
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PERSONALS

o o o

JOHN E. GOBLE and WILLIAM F. McCONNOR, left to right, have been appointed president and vice-president in charge of sales, National Tube Co.

• **John E. Goble** has been elected president of National Tube Co., a subsidiary of U. S. Steel Corp. Mr. Goble succeeds **Charles R. Cox**, who has become president of Carnegie-Illinois Steel Corp., another U. S. Steel subsidiary. Serving as vice-president in charge of sales, National Tube Co., since 1936, Mr. Goble has been with U. S. Steel and companies now affiliated with U. S. Steel for the last 21 yr. In 1925 he joined the Oil Well Supply Co. as South American representative, having his headquarters for 4 yr at Maracaibo, Venezuela. In 1929 he was transferred to the New York office of the Oil Well Supply Co. as assistant manager, export division. He was later promoted to manager of the division and remained in this position until he became vice-president of National Tube in 1936. **William F. McConnor**, general manager of sales of National Tube since 1936, has been named vice-president in charge of sales succeeding Mr. Goble. In 1920 Mr. McConnor was made assistant superintendent of a large pipe department at the company's Christy Park Works, McKeesport, Pa., and from 1923 to 1931 he was an assistant to the vice-president, operations, on steel distribution and seamless pipe. He was assistant general manager of sales from 1931 to 1936.

• **Dr. William L. McCracken** has been appointed to the position of administrative assistant to C. F. Dinley, Sr., vice-president in charge of research and engineering, Detrex Corp., Detroit. Dr. McCracken's new duties will provide both administrative and technical assistance to Mr. Dinley in research and product development.

• **Charles W. DeVoe** has been named regional manager of the Kansas City area for the Mullins Mfg. Corp. Mr. DeVoe, who has been with Mullins since 1939, will be in charge of the company's distribution in Iowa, Kansas, Oklahoma, Nebraska and parts of Arkansas, Wyoming and Missouri.

• **I. H. Lundgren** has been appointed assistant chief engineer of the Warren district of Republic Steel Corp. Mr. Lundgren goes to the Warren district from the Central Alloy district of Republic in Canton and Massillon, Ohio, where he has been employed since June 1933 as a draftsman and later as an engineer. He succeeds H. K. Irhig, who was recently promoted to the position of chief engineer.

• **John G. Thompson** has been made sales and service representative in California and Nevada for Reed-Prentice Corp., Worcester.

• **T. F. DeNormandie** has been named branch manager of the Buffalo office of the Jessop Steel Co., Washington, Pa. His offices are at 1015 Liberty Bank Bldg., Buffalo. Mr. DeNormandie has been associated with Jessop for the past 10 yr in various departments, including production, sales, and the sheet and plate division. During the latter part of the war, he was in charge of light armor plate production and sales.

• **John B. Mitchell**, formerly assistant to the vice-president in charge of manufacturing operations, Jones & Laughlin Steel Corp., Pittsburgh, has been appointed general manager of manufacturing operations, and **Carl C. Henning**, formerly manager of raw materials, has been appointed general manager of raw materials.

• **W. Douglas Peters** has been named assistant general sales manager, Foil Div., Reynolds Metals Co., Richmond, Va., in charge of product sales. His headquarters will be in Richmond. Mr. Peters has been with Reynolds in various capacities since 1934.

• **G. J. Parker** has succeeded **E. J. Norton** as manager of the Pottstown plant, of Spicer Mfg. Div. of Dana Corp., Pottstown, Pa.

• **S. D. Moxley** has been elected vice-president of the American Cast Iron Pipe Co. at Birmingham succeeding C. D. Barr who was promoted to the presidency recently, as reported in last week's issue of THE IRON AGE. Mr. Moxley, a native of Pennsylvania, went to Birmingham as a youth. He was chief engineer at Acipco at the time of his promotion.

• **E. I. Pollard** has been appointed engineering manager of Elliott Co.'s Ridgway, Pa., Div. Mr. Pollard is in charge of electrical engineering for the company replacing **Quintin Graham** who recently has been appointed assistant manager of the Ridgway Div.

• **Kenneth W. Green** has been appointed assistant purchasing agent, the Electric Storage Battery Co., Philadelphia. Mr. Green entered the employ of Electric Storage in 1927. He was formerly manager of Railway & Engineering Sales Div.

• **Thomas R. Donoghue** has been made safety director for the Pittsburgh Plate Glass Co., Pittsburgh. He will have complete jurisdiction over the industrial safety program in the 26 plate and window glass, paint, chemical, cement and brush plants operated by the company in 14 different states.

• **Lester A. Lanning,** recently appointed manager of the Sandusky plant, of the New Departure Div. of General Motors Corp., now building, has been appointed to direct completion of the plant, and to take charge of operations when they start.

• **Richard S. Smith** has been made president and treasurer of the Rigid-Tex Corp., Buffalo; **John E. Emerson,** vice-president and general manager; **E. S. Sidway,** assistant general sales manager.

• **Leigh B. Block,** vice-president in charge of purchases, on July 31 was elected a director of Inland Steel Co. He began his career at the Indiana Harbor works of Inland in 1924. In 1928 Mr. Block was appointed works purchasing agent and in 1932 was transferred to the sales dept. of the company's general offices in Chicago. Mr. Block has served as assistant vice-president and assistant manager of sales since 1934 and succeeds J. H. Morris who retired as secretary in April after 28 yr service with the company.

LEIGH B. BLOCK, director, Inland Steel Co.

• **Henry Moecker, Jr.,** has announced his retirement as manager of American Stove Co.'s Cleveland Manufacturing Div. Mr. Moecker has been manager of the Cleveland plant since 1934. He began with the company at Harvey, Ill., as a bench and machine worker in 1896 and rose to the position of plant superintendent in 1920. **A. W. Leeseberg,** formerly the production coordinator of the Cleveland division, has been appointed manager succeeding Mr. Moecker. He served for many years as manager of the enameling shop, and during the war as production manager for the company's aircraft manufacture.

A. W. LEESEBERG, manager, Cleveland Manufacturing Div., American Stove Co.

• **Harold W. Ball** has succeeded Lester Campbell as chief engineer of the Foster Machine Co., Westfield, Mass. He has been with the firm since October 1944. Mr. Campbell recently resigned after 50 yr with the company, as reported in the July 25 issue of THE IRON AGE.

• **Richard E. Davis** has been made New England district manager of the Westinghouse Electric Corp. to succeed **H. F. Burroughs,** who has retired after 46 yr service.

• **John H. Faunce, Jr.,** has been appointed as manager of sales of the newly opened Chicago office of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa. The Chicago office is located at 332 S. Michigan Ave.

MARCUS J. AURELIUS, sales vice-president, U. S. Steel Supply Co.

• **Marcus J. Aurelius** has been elected sales vice-president of the U. S. Steel Supply Co. Mr. Aurelius succeeds Mr. Worthington whose promotion was reported in a previous issue. Mr. Aurelius has been associated with U. S. Steel Corp. subsidiaries for most of the last 10 yr. He formerly served as a salesman and later as sales engineer in the Chicago railroad materials sales office of Carnegie-Illinois Steel Corp., and later was promoted to assistant to manager of the railroad materials and commercial forgings division of the company in Pittsburgh. Before joining Carnegie-Illinois, he was Chicago district sales manager for the Colorado Fuel & Iron Co. Mr. Aurelius will maintain headquarters in Chicago.

• **Charles G. Purnell** is now associated with Cabot & Co., Inc., Pittsburgh. Mr. Purnell was previously connected with Carnegie-Illinois Steel Corp. as a district contact metallurgist for 19 yr, as well as assisting in sales promotion and metallurgical development work with the trade.

• **Theodore K. Burgenbauch** has been appointed Electronics Div. production manager of Ellinwood Industries, Los Angeles. Mr. Burgenbauch formerly was with General Electric Co. in Schenectady, N. Y. He will now supervise production engineering, stock control, assembly and product test.

• **E. W. Chapman** has been appointed chief engineer of the newly created Industrial Pump Div. of Bowser, Inc., with headquarters in Fort Wayne, Ind. Mr. Chapman was formerly chief engineer of the Blackmer Pump Co., Grand Rapids, Mich.

• **Walter J. Johnston,** formerly in the export financial dept. of Bethlehem Steel Co., New York, has been appointed to the position of assistant treasurer of Nichols Wire & Steel Co., Davenport, Iowa.

• **Leslie C. Hughes** has been appointed consulting engineer for the chemical and process industries by the H. K. Ferguson Co., Cleveland. Mr. Hughes formerly had been employed by the Dorr Co., New York, as a consulting chemical engineer.

• **J. William Barker** has been appointed a vice-president and general manager of the Industrial Furnace Div., of Loftus Engineering Corp., Pittsburgh. Mr. Barker, formerly with Stein-Atkinson, Ltd. London, England, and Chapman-Stein, Mt. Vernon, Ohio, was one of the founders of Rust Furnace Co.

• S. B. **Applebaum** has been elected president of Liquid Conditioning Corp., New York; **H. L. Tiger,** vice-president and treasurer; **Norman L. Brice,** secretary and chief engineer; **S. S. Sulzycki,** assistant secretary and controller.

• **Gus Gran** has been appointed to the position of assistant sales manager and **Ben F. Welte** to the position of assistant chief engineer at Colonial Broach Co., Detroit. Mr. Gran, who has been with Colonial for the past 13 yr, was formerly assistant chief engineer while Mr. Welte, who joined Colonial in 1932 has been acting in the capacity of research engineer during the past several years.

• **W. B. Stephenson,** president of the Simplex Mfg. Co., Fond du Lac, Wis., for the past 30 yr, has announced his retirement. Sidney Lee will continue as manager of the firm.

• **A. E. Philips** has announced his resignation as vice-president in charge of marketing of International Plastic Corp., Morristown, N. J.

• **Dr. Harold R. Mighton** and **Dr. Thomas G. Fox** have joined the staff of Goodyear Tire & Rubber Co.'s research laboratory in the expansion of activities in the field of fundamental research on high polymers (synthetic rubber and plastics).

• **Herbert P. Ladds,** president, National Screw & Mfg. Co., has been elected a director of Clark Controller Co., to fill the vacancy caused by the death of **L. A. Watson,** vice-president in charge of engineering and research.

• **Edgar E. Kermode** has been named general plant superintendent, Mullins Mfg. Corp. plant at Warren, Ohio. He was formerly superintendent of the second shift.

• **Nelson R. Combs** has been appointed director of advertising and public relations for Designers For Industry, Inc. Mr. Combs, formerly with Lord & Thomas & Time, Inc., succeeds **Ben. M. Sternberg,** who has joined Blaine Perrigo Associates.

• **Dr. Grant R. Fernelius** has been appointed plant manager of the Elyria plant of Harshaw Chemical Co. Dr. Fernelius, who joined Harshaw in 1941, has been assistant to the vice-president in charge of manufacturing.

• **David M. Klausmeyer, C. Alfred Campbell, Guy C. Dixon** and **Earl J. Breech** were elected to the board of directors of the Marmon-Herrington Co., Inc., Indianapolis. Mr. Klausmeyer recently joined Marmon-Herrington as president, after 22 yr with the Chevrolet Div. of General Motors Corp. Both Mr. Campbell and Mr. Dixon have been associated with Marmon-Herrington for a number of years and are officers of the company, being vice-president and treasurer respectively. Mr. Breech is general manager and treasurer of the Merz Engineering Co., Indianapolis, wholly-owned Marmon-Herrington subsidiary.

• **Dr. W. M. Shafer,** until recently a member of the research and metallurgical staffs of Fansteel Metallurgical Corp., North Chicago, Ill., is now with the research dept. of The National Radiator Co., Johnstown, Pa. Dr. Shafer's new assignment will include metal powder research for the firm's Plastic Metals Div.

• **Warren J. Holmes** has been named export representative in the Philippine Islands for the Allis-Chalmers Mfg. Co., Milwaukee, Wis., and will work with the Earnshaw Docks and Honolulu Iron Works, distributors of heavy industrial equipment for the firm's general machinery division. Prior to joining Allis-Chalmers in 1944, Mr. Holmes spent 2 yr as consulting engineer with several firms.

• **K. D. Clark,** formerly zone manager at Portland for Pontiac Motor Div. has moved to the Los Angeles zone succeeding **John Bathrick,** who has resigned to become a Pontiac dealer. At Portland Mr. Clark's former position is taken by **S. H. Reeder,** who has been assistant zone manager. John Bathrick's dealership is in Highland Park, Calif., a Los Angeles suburb.

• **Frederick C. Abbott,** formerly manager of the New Products Div., has been named assistant production manager in the manufacturing dept. of the Pennsylvania Salt Mfg. Co. He reports to C. S. Beldin, production manager. **Hugh R. Bishop** has been named manager of the New Products Div. replacing Mr. Abbott. **Martin E. Johnson** has been transferred from the market research dept. to the New Products Div.

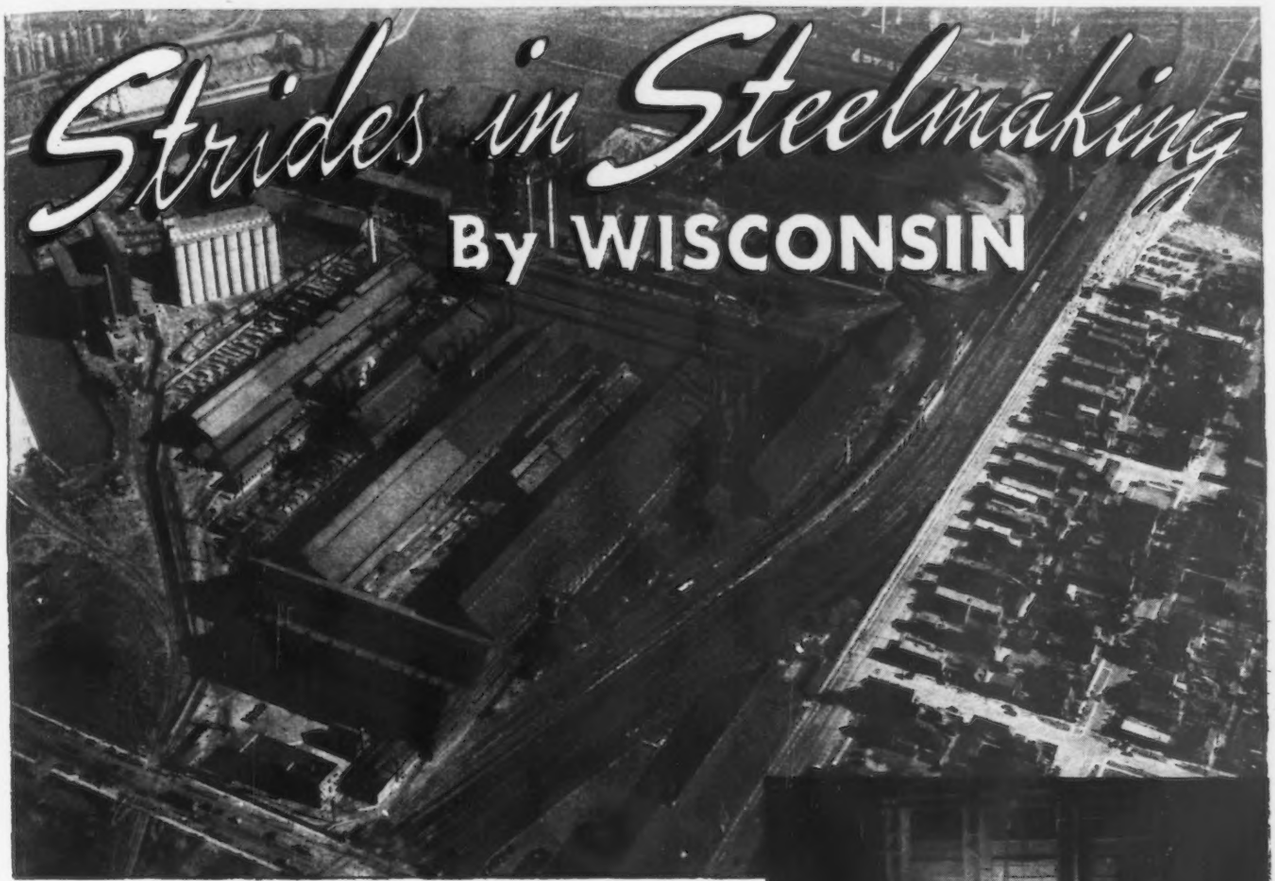
...OBITUARY...

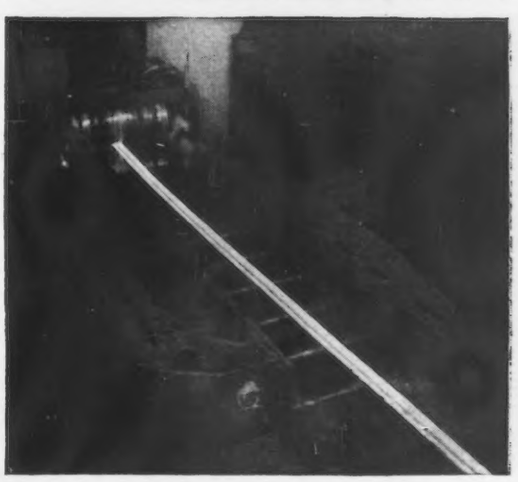
• **Frank A. Terry,** who retired from active duty as branch manager of Columbia Tool Steel Co., Cincinnati, in 1939, died recently at Brownsville, Texas.

• **Edwin C. Harrington,** a founder and former president of the Harrington & Richardson Arms Co., Worcester, died recently. He retired from business in 1938.

• **Carl J. Zaiser,** 67, president of Ampco Metal Inc., Milwaukee, died there July 29. He was active in civic affairs and a former newspaper man. He took over Ampco when it was a small foundry with seven employees and developed into one of the largest special alloy foundries with 2700 employees.

Strides in Steelmaking By WISCONSIN





● Two great strides in steelmaking are *Sulfite-Treated Steel,* the more machinable steel, and *"H" Steels,* alloy steels of guaranteed hardenability.

Sulfite-Treated Steel, originated and developed by Wisconsin metallurgists, has proven itself to be far more machinable than ordinary steel even after being hardened by heat-treatment. Yet its physical properties are entirely satisfactory. In every application where machinability counts, increased production and lowered costs have been the result.

"H" Steels are alloy steels produced to your "product prescription." This means that "H" Steels have a much narrower hardenability band *guaranteed.* Wisconsin has been a leader in the development of these steels and at present is the largest producer of "H" Alloy Steels.

Wisconsin's completely integrated operations from ore and coal mines to the finished steel, staffed by top-flight steelmakers, are your assurance of excellence in alloy and special steels. Our sales and metallurgical staffs are at your service.

WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN STEEL OPERATIONS

IRON ORE MINES COAL MINES OPEN HEARTH FURNACES
HEAT-TREATING, COLD FINISHING AND ANNEALING FACILITIES
ROLLING MILLS ORE FREIGHTERS BLAST FURNACES

WISCONSIN STEEL

Dear Editor:

97,500,000 PENGOES

Sir:

As you may find on your records, we have been subscribers before the war for over 30 yr. The technical management of our company has always studied your up-to-date publication with the greatest interest. We would like to subscribe again but at present we cannot remit subscription fees because banking connections between Hungary and the United States have not yet been taken up.

We request you, therefore, if possible, to please put us on your subscribers' list and forward us copies of your publication and then debit us with the fees until the remittance of money will be possible again. This, we do hope, will be soon after the peace treaty is signed with Hungary.

RIMAMURANY-SALGO-TARJAN IRON WORKS CO., LTD.
Budapest, Hungary

● This fling into international finances has the Circulation Dept. in a dither. Charlie Post, our normally affable and sane circulation manager, keeps staring out the window muttering "zero, zero, zero." With the aid of two adding machines and the local office boy, we calculated that a foreign subscription to The Iron Age, $15, was worth on July 11, 97,500 quintillion pengoes. On July 11, when the figures ran off the adding machine, the "index" pengo was established to bring the figures back on to the keyboard again. On the basis of the index pengo, a subscription is worth only a measly 97,500,000 pengoes.—Ed.

BRAZED GASOLINE ENGINES

Sir:

Some months ago your publication carried an article describing the manufacture of gasoline motors from tubing and sheet metal stock. The technique was to assemble formed parts in a jig and braze the assembly. I wish to refer to this article, but unfortunately am unable to locate it in my files of your journal. Will you please advise me the date of the issue in which it appeared.

D. R. CARPENTER
727 W. 7th St.
Los Angeles

● You probably have reference to the article "Brazed Sheet-Metal Automobile Engine" which appeared in the Jan. 24, 1946, issue. We are forwarding you a copy of this article.—Ed.

MEASURING ECCENTRICITY

Sir:

I would appreciate a copy of "Measuring Eccentricity of Welding Electrode Coatings," which appeared in the April 11 issue.

L. HARROP
Pittsfield Works Laboratory
General Electric Co.
Pittsfield, Mass.

TORSION BARS

Sir:

We understand that in a recent issue you covered the subject of torsion bars. We are very anxious to obtain a copy of this article.

W. WHITMAN
B & J Auto Spring Co., Inc.
Brooklyn

● Reader Whitman apparently has reference to a discussion of torsion bars which appeared on page 86-88 of the June 20, 1946 issue. Clippings of this item are being forwarded.—Ed.

WHAT PRICE EVOLUTION

Sir:

Could I obtain a copy of the editorial entitled "What Price Evolution?"

REV. M. A. CAYLEY
First Presbyterian Church
Rochester 8

IRON-PHOSPHORUS ALLOYS

Sir:

We are interested in obtaining a copy of an article entitled, "Pure Iron-Phosphorus Alloys," which appeared in the issue of Oct. 31, 1940. We are wondering if you would be able to tell us where we may obtain a copy of this issue.

C. L. SCHEER
Development Engineer
Foote Mineral Co.
Philadelphia

● We suggest you try the H. W. Wilson Co., 960 University Ave., New York, a back number magazine dealer who maintains a stock of back issues of THE IRON AGE. Or you can arrange with the Engineering Societies Library, 29 W. 39th St., New York, to have photostatic copies made.—Ed.

ALUMINUM BEARINGS

Sir:

We noticed in a Newsfront in the July 11 issue comments on aluminum alloy bearings and aluminum base bearings with steel backings and would like to have additional information on these items, as well as introductions to the people who are doing work with them.

L. A. CALKINS
Freedom-Valvoline Oil Co.
Butler, Pa.

● We would suggest that you get in touch with the Aluminum Co. of America, Cleveland, and the Cleveland Graphite Bronze Co., Cleveland, both of whom are active in this field. We understand that the Moraine Products Co. of Dayton, Ohio, has done considerable work in connection with steel backed bearings. General Motors Research Laboratories has run some tests of these bearings and may be able to give you some data in this direction.—Ed.

GERMAN PRACTICE

Sir:

In your June 27 issue you showed on page 67 a list of German technical articles which are now available. We are interested in one on compressors and if you can supply us with a photostatic copy, please do so . . . or if we should apply to the Government for this document, will you please be good enough to give us the name of the proper person to write to.

B. C. O'BRIEN
General Manager
Bury Compressor Co.
Erie, Pa.

● Copies of the German technical data described in the article Reader O'Brien refers to are available from the Office of Technical Services, Dept. of Commerce, Washington 25, D. C. To expedite receipt of this material, we suggest that you be sure to give the "PB" number which was indicated in the article in connection with each item. Checks, of course, should be made payable to the Treasurer of the United States.—Ed.

DRAWING ALUMINUM

Sir:

We would like to obtain a copy of the article pertaining to experiments at the University of California with reference to deep drawing of aluminum in the Feb. 14, 1946, issue. We would appreciate a copy of this article if it is available.

THOMAS G. MILLER
Green, McCallister & Miller
Pittsburgh

● We are forwarding you with our compliments a copy of the article "Drawability of Aluminum Alloys."—Ed.

SYNTHETIC DETERGENT

Sir:

We read with interest the article on p. 55 of the Jan. 31 issue "Synthetic Detergent Additions in Cleaning Baths." Would you please send us the address of the company that manufactures this product.

C. K. Le FIELL
Le Fiell Mfg. Co.
Los Angeles 11

● The company that manufactures this product is the National Aniline Div. of Allied Chemical & Dye Corp., 61 Broadway, New York.—Ed.

NEW FORGING METHOD

Sir:

On the Newsfront page of the June 27 issue we note "A new forging method using a restricted V type die, etc." Can you tell us where we may obtain additional information on this process.

W. A. BARNES
Chief Engineer
Utica Drop Forge & Tool Corp.
Utica 4, N. Y.

● The process mentioned in the Newsfront item is described in the article "Forging High-Alloy Rounds with V-Type Dies," in the Aug. 1, 1946 issue, p. 44.—Ed.

YOU GET MORE PRODUCTS PER TON WITH N-A-X HIGH-TENSILE STEEL

★

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★

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N-A-X HIGH-TENSILE is exceptional among high-strength steels because of its unique combination of strength *and ductility*. It can be cold-formed to intricate shapes and deep-drawn to produce parts normally fabricated out of mild carbon steels. N-A-X HIGH-TENSILE has demonstrated its formability in scores of severe fabricating operations, and requires little or no change in die design or press capacity.

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By designing sections to take advantage of the high physical properties of N-A-X HIGH-TENSILE, manufacturers can use less steel per unit, get more units per ton. How great this increase will be depends, of course, on the particular part or product. But it is entirely reasonable to expect that three tons of N-A-X HIGH-TENSILE can be made to produce as many units as four tons of carbon sheet steel.

NOW LET'S LOOK AT OVER-ALL COSTS

There is only one fair way to compare the price factor of N-A-X HIGH-TENSILE and carbon sheet steel, and that is on the basis of over-all costs. It is our conviction that N-A-X HIGH-TENSILE will "pay its own way" by increasing production per ton, and by making possible many economies in handling, fabricating and finishing. We are ready to work with you closely on your particular problem of using N-A-X HIGH-TENSILE to make a ton of steel go farther.

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This Industrial Week . . .

- **Steel Operations Hit Postwar Peak**
- **Tinplate Controls May Soon Be Eased**
- **Price Wrangle Slows Scrap Shipments**

STEEL operations this week hit a new postwar high, with the industry set up to produce at the rate of 91.5 pct of capacity, a point higher than it has operated during the past three weeks. Thus, while facing shortages of scrap, freight cars and coal, steel production continues its upward trend. Production of steel at the rate established for this week will amount to somewhere in the neighborhood of 1.5 million net tons of ingots or about a million net tons of finished products.

Scrap continued to be the immediate problem of the steel industry, and events of the past week tended to make matters worse. The Scrap Institute's national affairs committee meeting in Cleveland, at which it was determined to seek a $3.50 a ton temporary price increase, resulted in dealers—and possibly many producers—withholding scrap shipments in anticipation of higher prices. Production scrap is increasing in volume steadily in fabricators' plants, but much of it is being stalled on its way to the mills.

Scrap dealers, in the face of increased costs of materials and help, feel they need higher scrap prices and will attempt to gain the $3.50 a ton permanent increase, plus an increase of $1.50 a ton (to a total of $5.00 a ton) for preparation of scrap. Opponents of this price increase, mainly in the steel industry, point out that this will result in a flat cost increase of about $1.50 a ton on steel, and add unnecessary impetus to the inflationary spiral that is already gaining speed.

INDICATIONS point to the easing and possibly the revocation of tinplate use restrictions under Direction 9 to Order M-21 after Sept. 30, according to tinplate industry advisers to the CPA. The fact that requirements for food packing will diminish after September, plus an improved supply, bodes well for the easing of these controls. CPA's fourth quarter export allocation of tinplate, set at 136,000 tons, exceeds by 24,000 tons the quota for the third quarter. The bulk of the quota for the last quarter will go to areas south of the equator where the heaviest food pack comes in the fourth quarter. CPA said these allocations will be used entirely for preservation of food in or for famine stricken countries and will help take pressure off of American food production.

While pig iron output is pretty close to the capacity of all furnaces in operation, there is not nearly enough to fill current needs. Southern producers screamed to CPA that their entire output fell under the iron allocation plan, shutting off their iron to many foundries without certified orders. Some easing seems apparent on this score. Small foundries have tried to turn to greater use of scrap in their melts, but aside from the fact that scrap is hard to get, they are having trouble with their castings.

Textile machinery manufacturers' foundries, with a backlog of five to six years work, recently formed what amounts to a bloc among themselves to bring pressure on Washington for relief. Being financially strong themselves and having some powerful friends, the outcome of their fight will be interesting.

OPA's refusal to grant further pig iron price increases is taken to indicate an intensified move through the RFC and the National Housing Administration for subsidies for marginal furnaces, and also an intensified action to relieve individual "hardship" cases. OPA Administrator Paul Porter said that the $2 a ton increase just granted offsets added costs, and studies indicate that any further overall increase would not be likely "to increase production from furnaces now in operation." Those not in operation, however, are likely to plead for individual price increases to cover their higher costs, and, in doing so, get the support of RFC and NHA.

LABOR shortages add another threat to steel production in the Chicago area. The shortage at first was confined to laborers, but now its scope includes skilled workers. Mills are reluctant to pay premium wages for overtime, but occasionally it is necessary. The labor shortage is not only the result of not enough new workers available but also of a relatively high termination of workers already employed.

Carbuilders have approached the steel mills in an effort to find out how soon they can get steel for the critical freight car building program. Unless carbuilders get priority assistance, only about 50 pct of scheduled production can be produced during the remainder of the year. If priority assistance is given carbuilders, steel producers will strenuously urge that such materials be used only for domestic freight car construction. Shippers, taking the car shortage seriously, are attempting to speed up car transfers and utilize cars to the fullest so as to preclude tieups of products should the situation get worse.

• **FASTER SHEET OUTPUT**—Plans for relocation of Inland's four-high five-stand cold reducing mill are well under way. The structural work has been awarded the Bethlehem Steel Co. and amounts to 10,000 tons. Foundation work will be built by Inland. By rearranging the mill facilities, it will be possible to attain higher production rates and more tonnage of vitally needed sheet and strip.

• **ORE OUTPUT STILL LOW**—June iron ore production totals 8,849,939 gross tons and compares with 4,578,309 in May and 11,460,272 in June 1945, according to data released by the U. S. Bureau of Mines. The Lake Superior district supplied 91 pct of the U. S. ore output and 92 pct of the shipments. Iron ore production and shipments during the first half of 1946 totaled 19,457,855 gross tons and 19,086,098 tons respectively, just about one-half the corresponding figures for 1945. Stocks of iron ore at mines on June 30 totaled 5,367,267 tons—a decrease of 16.6 pct from the May inventory.

• **RED INK BLUES**—The UAW-CIO executive committee was informed by its treasurer, George F. Addes, that the union is operating at a $70,000 a month loss and has less than $100,000 cash on hand. Dues paying members, expected to increase in number, have fallen off from a wartime peak of 1,245,000 to 696,000. About 200 organizers have been taken off the payrolls since the last convention and further staff cuts are expected. Dismissed organizers are demanding job seniority and greater job security from the union.

• **HIGH FINANCE**—Tucker Corp. leased the Dodge plant in Chicago from the government with the understanding that final settlement would be made by Oct. 1. Tucker had to have the plant before approaching investment houses for backing. The prolonged delay in announcing the financial backing is because suitable arrangements have not yet been made. Tucker has been in consultation with the bankers for the past 2 weeks with both sides attempting to close a good deal. One combine willing to sink $5 million wanted 49 pct of the total interest and was turned down. It is expected that complete arrangements will be consummated within 30 days.

• **BRITISH STEEL PRICES**—A general British steel price increase to be announced this week will total $1 a ton. The British Iron & Steel Federation estimates coke costs are up 138 pct from 1939; transport 7.3 pct; and the steel wage increase of June added $1 a ton to costs of heavy steel products. The British Government is expected to modify arrangements for the nationalization of the steel industry to make it possible for steel executives to accept jobs on the control board. This will probably mean a separating job of defining limits of Nationalization from the steel control board functions.

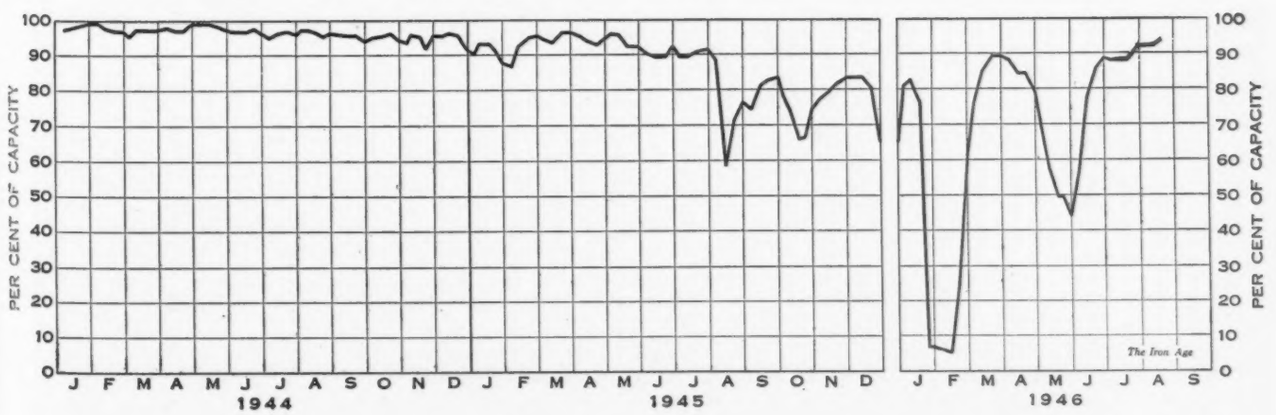
• **WORLD SILVER PRICES**—Although no official announcement has yet been made, it is expected that the London selling price of silver will be raised in the near future from its present level of 73¢ to 92¢ per oz. Even at this figure the official selling price would compare favorably with prices that have been paid for silver in the nonofficial market in London during the past few months. Prices for the sale of lines of silver, including some of Russian origin, have recently ranged from 90¢ to 93¢ per oz, and in some cases still higher prices have been paid.

• **BRITISH PREFABRICATED HOUSES**—Cars specially built to carry 24,000 triangular tubular steel roof trusses for 6000 prefabricated permanent steel houses are to be run by the Great Western Railway in a shuttle service between Newport, Wales, and sites in all parts of Britain. Each wagon will carry 40 trusses, 25 ft long at the base and rising to 5 ft 3 in. at the apex, which would be sufficient for ten houses.

• **GI'S LEAD WAY**—Production at the Allis-Chalmers, Norwood, Ohio plant is now up to approximately 50 pct of capacity. Operations at the strike-bound plant were resumed early in May when 40 or 50 GI'S decided to go back to work and let it be known that they wouldn't need police protection to get there. Some picketline violence occurred and 40 or 50 arrests were made but out of the 1400 odd employees, 581 have now returned to their jobs. Positive GI action seems to be the trend in industrial fields as well as political.

• **SHEET CAPACITY GAINS**—With sheet and strip capacity already 1 million tons greater than in 1941, the record prewar year for output, the American Iron & Steel Institute pointed out this week that by July 1, 1947, capacity will be increased another 2.5 million tons. Further as the quantity is increased, new types of rolling mill equipment will provide higher quality flat rolled steel and better finishes.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 6.....	98.0	90.0	88.0	87.0	95.0	102.0	94.0	99.0	100.0	70.0	106.0	55.0	89.5	90.5
August 13.....	100.0	93.0	88.0	87.0	95.0	102.0	94.0	99.0	101.0	70.5	100.0	60.0	89.5	91.5

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New Factors Complicate Scrap Supply Problem

New York

• • • **Factors that** last week gave some scrap market observers reason to feel that the worst had passed have since been overshadowed by subsequent developments. Overall gains in industrial output, indications that July employment had hit a new 60 million high, and a definite improvement in fabricators' scrap lists seemed to indicate a healthier trend.

Last week's occurrences, threefold in nature, have offset these earlier trends and the outlook now is even a little more confused than it was a month ago. The improved production of scrap, dealers are frank to admit, did not improve shipments to the mills during the past week. The hopes for price relief in scrap were raised by the Cleveland meeting on Aug. 6 of the national affairs committee of the Scrap Institute, and gave dealers, large and small, an incentive to hold back on shipments to the mills.

Further, a wrangle has developed on the question of shipbreaking, a scrap source that was expected to yield heavy tonnages of scrap by winter. The difficulty is in completing the arrangements for the sale of the ships by the Maritime Commission and the Navy to the shipbreakers. With scrapping charges high, shipbreakers insist that the ships must be released at something like $1.50 to $2.00 a ton in order that they can break them and still sell the scrap under OPA ceilings. The services are reported to be hesitant to sell at this low figure.

Another factor that looked good last week but has been snarled by red tape and delaying actions is the scrapping of a considerable tonnage of surplus held by the WAA. This program has been expected, but actually it is now anyone's guess when it will begin.

Trade sources agree that scrap is being withheld in hopes of a price rise. However, the quantity involved is reliably reported to be insignificant compared to total current requirements. The question naturally arises: Would OPA price relief affect scrap volume?

By GEORGE F. SULLIVAN
Associate Editor

o o o

From steel industry sources the answer appears to be "No!" although many steelmakers are agreed such relief should be granted in some form.

Scrap trade sources cite two probable effects of a favorable change in the scrap price structure. The first would be the immediate release of accumulated stock in dealer's yards, which, while small would nevertheless bridge the gap until production scrap volume gathers greater impetus. The second would be to guarantee the dealer, and incidentally the "junkie," a reasonable profit on steel scrap and bring out some remote material.

Scrap dealers are not believed to be in a bad plight financially because of their other operations in nonferrous, salvage and allied lines. But a comparative cost study indicates that many are not breaking even on their steel scrap operations. In 1940, the base period of the present OPA law, THE IRON AGE average composite price for No. 1 heavy melting scrap was $18.67 a ton. Today's price is $19.17, a difference of 50¢.

Few yards keep accurate cost figures, and even then it is difficult to separate steel preparation from nonferrous and other yard costs. One of the largest and most efficient yards in the country reports the following increases in material costs over 1940: Gasoline, 23 pct; motor oil, 15 pct; oxygen, 8 pct; acetylene, 6.5 pct; torches, 34 pct; burning hose, 22 pct; safety shoes, 20 pct; and gloves, 25 pct. In addition to other capital items there is the cost of replacing motor trucks, a figure that has jumped about 25 pct.

Labor costs at this particular yard have likewise increased sharply since 1940. These increases amounted to: Yardmen, 39 pct; drivers, 38 pct; helpers, 50 pct; burners, 54 pct; shearmen, 54 pct, and crane operators, 54 pct.

The average labor cost rise amounted to 48 pct, and yard operation of this company accounts for 31 pct of its overall operating costs. In addition, office help salaries have jumped 30 pct.

While specific figures are difficult to obtain for the reasons outlined, it is quite obvious, the dealers state, that the cost of preparing steel scrap has risen by considerably more than 50¢ a ton since 1940.

Two possible changes in the scrap price structure have been suggested. Many dealers believe that an increase of $3.50 a ton across the board is justified. They also ask that the spread between unprepared and prepared scrap be increased by $1.50 a ton.

Some steel executives state that a $3 scrap price increase, which would add almost $1.50 a ton to the cost of finished steel would add unnecessary impetus to the inflationary trend. A more practical solution, they believe, would be the imposition of ceilings on unprepared scrap in such a way as to guarantee the dealer a definite margin within which he may earn a reasonable profit.

The latter view is shared by Robert W. Wolcott, president of Lukens Steel Co., and chairman of the scrap committee of the American Iron & Steel Institute. Mr. Wolcott states that the situation is very critical because production scrap is not coming out in sufficient volume. "Though I do not have definite figures," he added, "I doubt that stocks in dealers yards represent a substantial proportion of the scrap tonnage needed by the steel industry. Hence an advance in price would serve no useful purpose. With ceilings on unprepared and prepared scrap, rigidly enforced to stop many current malpractices, the scrap dealer should be able to earn a reasonable profit. And I do think the dealer is entitled to a reasonable markup. But if the farmer, the founder or the fabricator gets a higher price for his scrap it merely adds up eventually to a higher price for machinery and raw materials," Mr. Wolcott stated.

Proponents of an OPA-enforced

spread between prepared and unprepared scrap cite the malpractices referred to by Mr. Wolcott in support of their arguments. Abandonment of OPA controls in July, they assert, caused an upsurge in the practice of overgrading which in at least one case permitted an eastern mill to acquire larger stocks than it would otherwise have received.

Observers here are agreed that no overnight miracle will alter the seriousness of the situation, but they believe that the scrap dealer is entitled to definite OPA price action to permit him to earn a reasonable profit on steel scrap. All sources agree that immediate return of production scrap is vital.

It is believed here that if the industry's prophets of doom could be persuaded to tone down their dire forebodings the true picture could more accurately be presented. The reference is to the widely publicized prediction early in July that the steel rate would fall 30 pct by the end of that month unless there was an immediate change in the scrap picture. There was no significant change, yet the ingot rate for the week including July 30 was 90.5 pct. The situation is serious in its own right, it is felt, and unwarranted predictions serve only to confuse the issue.

Lake Shipping Strike Threatens To Cut Steel Operations This Winter

By WILLIAM A. LLOYD
Cleveland Regional Editor

o o o

Cleveland

• • • Sour weather of a sort kicked up by the CIO's National Maritime Union was scheduled to strike the Great Lakes shipping lines this week. The union threatened to carry the strike, scheduled for Aug. 15, to a point at which all vessel movement would stop. That would mean stoppage of 85 pct of the iron ore upon which America's steelmaking industry depends. Simultaneously, it would halt delivery of one in every 10 tons of soft coal mined in the United States, the volume necessary to supply the heavy manufacturing areas and homes of the Great Lakes states.

At the same time, the greatest crop of grain in history would stay on farms in the Canadian prairie provinces and the United States Middle West.

CIO's NMU represents 9 pct of the 12,000 lake seamen who, throughout the war years, moved 4½ times all the tonnage carried by America's salt water Merchant Marine. The union, admittedly having failed since 1937 to make better progress in its organizing effort, sought to rally all the 12,000 unlicensed seamen of the Great Lakes around its demand for a "shortened work week" of 40 hr.

Operators of the vessels whose crews comprise the other 91 pct of seamen called the strike an "attempt to obtain by intimidation what the union has failed to accomplish through peaceful means recognized by law."

They pointed out that vessel operation on a 40-hr week is impossible and that the CIO, which speaks legitimately for crews on only 40 of the 444 Great Lakes vessels, in reality demands increased wages, to be paid as overtime.

Lake seamen, they said, already have received increases ranging from 76 to 105 pct since January 1941, including a substantial raise this spring. Currently they are making 10.83 pct more for their month's work than the average deep-sea man, including the latter's recently-won overtime beyond 48 hr, according to figures of the Lake Carriers Assn.

Some nine times since it began trying to organize Great Lakes seamen, the CIO's NMU has been repudiated in elections called by the NLRB. Recent instances of the sort include voting aboard U. S. Steel Corp.'s Pittsburgh fleet, the largest on the lakes—the Cleveland Cliffs iron fleet of 22 vessels, and among crews of the Bradley Transportation Co., also operated by U. S. Steel.

The latter two took place this spring, along with NLRB balloting to determine what union would represent engineers of the entire Great Lakes fleet. In that election, the CIO's MEBA won bargaining rights for only a single vessel.

To supplement its meager representation, CIO strike leaders, headed by NMU's president, Joe Curran, called on dockside unions to refuse to handle any cargo. Most dock workers are affiliated with the AFL, which agreed not to unload vessels under CIO contract but said they would handle cargoes of other vessels, amounting to 90 pct of the

POWERLESS POWERHOUSE: *The caption furnished with this picture, from the office of Edwin Pauley, reparations commissioner, describe this ghostly scene as the Fushun, Manchuria, power plant from which two 50,000 kw generators were removed during Soviet occupancy. Power loss is said to threaten Fushun coal mines.*

total lakes movement, as usual.

Up to the strike deadline, which marked the approximate midpoint in the normal Great Lakes shipping season, bulk freighters were breaking records in the coal movement and almost equaling their 1945 mark in the movement of ore.

Nevertheless, they were far behind in their scheduled delivery of 60,000,000 tons of iron ore and 50,000,000 tons of coal. Strikes in iron mines, coal mines and railroads earlier in the season had cut off both their fuel and cargo for an appreciable period.

In July they showed 7.7 pct increase in coal movement, as against the last war year, by handling 2,010,417 net tons of bituminous in a single week. Total ore cargoes had picked up to almost the same monthly level as for the comparable period before VJ-Day.

But in both commodities, as well as in grain and limestone, the fleet was still behind on requirements.

Stockpiles of ore at Lake Erie docks and in furnace yards, at mid-August, indicated that the steel industry at its present consumption rate of 6½ million tons of ore monthly, would soon face a shortage and might have to shut down entirely sometime in December or January for lack of raw materials, if the CIO managed to carry out its threat of freezing the movement of all Great Lakes vessels.

The July iron ore movement, according to the Lake Superior Iron Ore Assn., amounted to 10,848,385 gross tons, 4.61 pct under the 11,372,282 tons moved on the lakes in July 1945. But the July movement brought the 1946 season tonnage to only 23,848,839 tons, or about 41 pct less than the 40,396,868 tons that had been moved by Aug. 1, 1945.

While some Canadian ore carrier capacity is available to U. S. furnaces as a result of the Canadian steel strike, the overall iron ore movement will decrease, augmenting the prediction of one ore executive that the 1946 movement will be less than 60,000,000 tons.

Shipments of iron ore from Steep Rock totaled 165,000 tons in July, and production is continuing at the current rate. According to company officials' expectations, shipments will exceed the minimum estimate of 818,000 tons for the season at the end of the Great Lakes navigation season in November.

Labor, Management in Deadlock On Demands in Canadian Steel Strike

Toronto

• • • **Canada's steel** strike has entered its fourth week, and there are no indications of an early settlement. The steel companies involved in the strike, The Steel Co. of Canada, Ltd., Algoma Steel Corp., and Dominion Steel & Coal Co., have not weakened on their proposals regarding wage increases, while on the other hand the union leaders are just as steadfast in their demands with the result that meetings continue to be held in Ottawa without any concrete evidence that a settlement is in the offing.

In the meantime, however, the Steel Co. of Canada continues production at its Hamilton works, although its various fabricating plants at Hamilton, Swansea and Montreal, gradually are tapering off operations due to steel shortages; Algoma Steel Corp., and Dominion Steel and Coal Co. are completely shut down insofar as steelmaking is concerned.

According to reports from Hamilton, fresh supplies of workers are continually making their way into the Stelco plant and it is claimed that almost 3000 workers now are on the payroll against around 2000 when the strike first was called. Stelco is piling its finished materials pending settlement of the strike and removal of picket lines, which will permit shipping of the big tonnages of steel that now is stacked in the plant grounds and being added to daily.

With the closing down of the big producers at Sault Ste. Marie and at Sydney, N. S., and taking into consideration the time required to get fires lighted and operations again underway, at least 50 pct of Canada's third quarter iron and steel production will be lost.

With iron and steel shipments almost totally suspended, industrial plants throughout eastern Canada that are dependent on iron, steel and other metals for raw materials, have started a general layoff of workers and by the middle of the month it is estimated that industrial activities in this country will be reduced by 50 to 70 pct.

NAVY SCOUT: *This new XOSE-1, built completely by Edo Aircraft Corp., is the Navy's newest catapult-launched plane for scout observation. With a range of more than 1000 mi at a top speed over 200 mph, it combines lessons learned in World War II and carries an array of depth bombs, guns, rescue cells, radar, etc. Its folding wings permit storage in restricted areas.*

FINISHING STAINLESS SHEETS: *Cold-rolling and inspection of stainless steel sheets at Eastern Stainless Steel Corp., Baltimore.*

INDUSTRY

Eastern Stainless Steel Lifts Output to 20 Pct Of Sheet Market

o o o

By JOHN ANTHONY
Eastern Regional Editor

o o o

Baltimore

• • • **The steady expansion** of activities of the Eastern Stainless Steel Corp., Baltimore, continues to attract considerable attention within the industry, not only because new and growing companies are relatively rare in such an established and highly competitive industry, but also because this particular company is rapidly building an organization of long experienced production and sales executives and is concentrating exclusively on stainless steel sheets. Eastern is the only company devoting its full efforts to stainless sheets.

The predecessor company, the Eastern Rolling Mill Co., had for a few years rolled small tonnages of stainless sheets. But it was not until 1941 that Eastern Rolling Mill became a real factor in the stainless sheet market. Steady progress was made in its development of the business throughout the following years. In 1944 successive reorganizational shifts culminated in an ownership-management team involving experienced production personnel and extensive warehousing outlets that strengthened the position of the company for the postwar period. There was a change of name from Eastern Rolling Mill Co. to Eastern Stainless Steel Corp. in September 1944.

It is estimated by THE IRON AGE, that in 1941 the company's sales represented about 10 pct of the entire stainless sheet market; in 1942 and 1943 about 17 pct and in 1944 and 1945 about 13 pct. The decline in the last two years was due primarily to reconstruction of production facilities and labor shortage. In 1946, partly as a reflection of operational refinements and the installation of eleven new heavy duty polishing machines, Eastern has lifted its output so that it now accounts for approximately 20 pct of the total stainless sheet market.

The management expects that by the end of the year nine additional polishing machines will be installed. The new building to house this equipment is nearly completed. A new 54 in. 4-high mill built by the Lewis Foundry & Machine Co., which will double cold-rolling capacity, has already been installed and will begin production in the first week in August. Added annealing capacity of 1500 tons per month has been provided by two new annealing furnaces and an additional modern pickling unit is being installed. As a result of these increases in facilities, production by the end of the year should be 50 pct over present production.

There has been a serious bottleneck in the delivery of polishing machines which has bedevilled the

POLISHING STAINLESS: *Battery of ten sheet polishing machines at Eastern Stainless Steel Corp., Baltimore.*

entire stainless industry since the war's end, and Eastern's acquisition of 20 new machines within the period of less than a year has been no mean accomplishment.

Management has been the responsibility of Thomas F. McLaughlin, president, who came to Eastern in mid-1944 after two years as assistant to the president of the Crucible Steel Co. Prior to that time, Mr. McLaughlin was operations vice-president of Rustless Iron & Steel Corp. and was largely responsible for perfecting the unique Rustless process of direct chrome additions by the use of chrome ore rather than ferrochrome and hastening that company's growth to one of the country's major stainless producers.

The great fund of production know-how that Mr. McLaughlin brought to Eastern has resulted in a series of production changes and innovations, one resulting in the doubling of hot mill output in tonnage per turn between August 1944 and February 1946. A further increase is anticipated as the result of time and methods studies and incentive plans now being completed. These changes should increase output, reduce costs and provide higher employee earnings.

Last August when Eastern acquired the capital stock of Industrial Steels, Inc., Cambridge, Mass., a change took place whereby the child seemed to outgrow the parent. For it was John M. Curley, owner and manager of Industrial Steels, Inc., who, recognizing the future importance of the stainless sheet market and the possibilities of the Eastern Rolling Mill Co., together with the Russell interest, acquired sufficient financial interest in the company to effect a reorganization in the management. These changes have served to lift the company to a position of real importance in the flat-rolled stainless steel industry. Mr. Curley now is chairman of the board of Eastern.

Industrial Steels, Inc. is believed to be the largest warehouse in the country whose activities are confined to stainless steels. Estimates have been made that Industrial's 1944 sales represented over 8 pct of total warehouse sales of stainless steel in the United States, and nearly 40 pct of Atlantic area sales, as reported by the American Steel Warehouse Assn.

In general, the board of directors of Eastern is made up of men who head their own companies in the steel industry. There is William F. Finkl, president of A. Finkl & Sons Co., Chicago, a prominent die-block manufacturer and producer of heavy alloy forgings; George H. Philson, president of Cann & Saul Steel Co., Philadelphia; and Edward F. Byrnes, treasurer, Rockwool Insulation Co., Boston. Other board members include Gordon W. Russell, company treasurer, and Warren K. Russell, general manager of the James Russell Engineering Works, Inc., Boston, who have had wide experience in the fabrication of stainless steel.

According to published records, the dominant financial interests at Eastern are held by Mr. Curley, chairman, Mr. McLaughlin, president and the Russell interests. Other managerial and operational personnel include James D. Glenn, vice-president in charge of sales, who came from Sharon Steel Corp; Walter F. Schneid, vice-president in charge of operations, who was plant superintendent at Rustless and later at Crucible; Henry Schaufus, Eastern's chief metallurgist, who came from Rustless and Crucible; and Lachlan Mackenzie, assistant to the president, who was engineering consultant to the chairman of Crucible.

Steel Container Orders And Output Still High

Washington

• • • **Production of steel** shipping barrels, drums and pails during June amounted to 1.8 million; heavy type steel barrels and drums, 692,000; and steel packages, kegs, and pails, 4.6 million, according to the Bureau of Census. While heavy and light types of steel barrels and drums showed decreases from May output, production of steel shipping packages, kegs and pails increased 8 pct over output in May.

Unfilled orders for containers increased during June. On June 30, orders for heavy steel barrels and drums totaled 9.8 millions, 13 pct more than at the end of May; and light barrels and drums showed a slight increase over the 2 million ordered at the end of May. Steel packages, kegs and pail orders totaled 21.5 million units, up 10 pct over May and higher than at any time since July 31, 1945.

In June 23 manufacturers operating 46 plants handled the volume of business for heavy type barrels and drums, while 25 producers with 44 plants produced the light type barrels and drums for sale and 22 manufacturers operating 35 plants manufactured them for their own use. Steel packages, kegs and pails were produced for sale by 32 manufacturers operating 40 plants, and 12 producers with 18 plants made these items for their own use.

Soil Pipe Shipments Slip Sharply in June

New York

• • • **Shipments of gray** iron castings, including soil and pressure pipe, during June 1946 amounted to 735 thousand short tons, a decrease of 3 pct from the 757 thousand tons shipped during May, according to a report released by the Bureau of the Census.

Shipments of castings for sale to the trade amounted to 436 thousand tons, 59 pct of the total, and were down 4 pct from the corresponding May shipments. The remaining 299 thousand tons were produced for the manufacturers' own use, and were only slightly less than those produced in May. Unfilled orders for commercial castings on June 30 totaled 2.6 million tons, 6 pct higher than the orders on the books at the end of May.

Shipments of cast iron soil pipe dropped sharply to 23 thousand tons, 23 pct under the 30 thousand tons reached in May, and were at their lowest point for the first half of the year. Shipments of cast iron pressure pipe and chilled iron railroad car wheels were each down 8 pct from the May figures, but shipments of molds for heavy steel ingots increased 27 pct over the corresponding May figure.

Detrola Corp. Acquires Properties of Andrews Steel and Subsidiaries

Cincinnati

• • • **Purchase of the** steelmaking, rolling mill, and fabricating plants, as well as the coal mining interests of the Andrews Steel Co., by the International Detrola Corp., was announced Aug. 8, by K. M. Russell, assistant to the president of Detrola.

Properties included are those of the Andrews steel plant division in Wilders, Ky., and the Newport Rolling Mill Co., and its divisions; The Globe Iron Roofing and Corrugating Co., and the Newport Culvert Co., Newport, Ky., employing more than 2000; and the entire Hardy-Burlingham Mining Co., Perry County, Ky., employing 350. The purchase price was not disclosed.

"These specialty steel facilities will continue to serve many fabricating and manufacturing industries as they have done for more than half a century," said C. Russell Feldmann, president and board chairman of International Detrola Corp.

The Andrews plants in Wilders and Newport, opposite Cincinnati, have more than a million sq ft of plant buildings on land aggregating 160 acres. There are 11 miles of railroad trackage with seven company-owned locomotives. The openhearth capacity is 413,100 net tons a year, while the rolling mills have annual rated capacities of 180,000 tons of hot-rolled sheets, of which 60,000 tons may be silicon sheets, 65,000 tons for galvanized or galvannealed sheets, and the balance in alloy or miscellaneous other grades of flat rolled products.

The Hardy-Burlington Coal mines, with a monthly capacity of 70,000 tons, are now producing about 55,000 tons a month of which 80 pct is sold and the balance used for steam power and gas producers. Globe operates facilities for making corrugated roofing, all types of formed roofing products, conductor pipe, eave troughs, and fabricated building materials.

Andrews Steel Co., which has been the subject of rumored sales for the past six months, dates back to 1885 and was controlled by the Andrews family until 1943 when Lehman Bros., New York, bought ¾ interest and Norman B. Schreiber, Chicago engineer, ¼ interest. Lehman sold his holdings to a group headed by Paul D. Angell in March, 1944, and this group sold the stock to Detrola. The plant will be closed down for several days while inventories are completed.

Payroll, Work Week And Employment Up in Steel

New York

• • • **The total payroll,** average hours worked and average number of employees within the steel industry increased during June from the previous month, the American Iron and Steel Institute stated. During June the total payroll was $125,589,900 compared with $121,422,200 the previous month.

The average number of employees was 578,000 in June and 562,900 in May. The average work week of wage earners increased to 34.6 hr in June from 32.6 hr in May.

Average earnings per hr of hourly, piecework and tonnage workers was 134.4¢ per hr in June compared with a record payment of 135.8¢ per hr in May.

Niles Workers Return

Boston

• • • **Niles-Bement-Pond Co.** West Hartford workers, some 2500 of them, after staying out 21 weeks have decided to accept the firm's offer of 12¢ to 18¢ an hr pay increases.

About 4200 are on strike at 14 Massachusetts plants, most of them for a long time, according to the state board of arbitration and conciliation. Two work stoppages, one at the Monsanto Chemical Co., Everett, involves 700 and the other at Allis-Chalmers Corp., Hyde Park, which involves 400 to 500, cannot be settled locally.

U. S. Employment Service at Boston reports an encouraging increase in employment of men, mostly war veterans, but fight shy on issuing figures. Furthermore, there are still thousands of veterans who prefer to fight shy of jobs, draw down their $20 a week and go to ball games.

Cincinnati Sees Red

Cincinnati

• • • An old Cincinnati name is coming forward with new vigor after a virtual lapse during the war: Ahrens-Fox fire engines again reflect bright red against the drab machine tools of this city. Acquired recently by the R. K. Le Blond Machine Tool Co., production of the world famous small boy's delight is being resumed after very limited output during the war years. Old files at Ahrens-Fox disclose engines sold to Australia, Norway, South Africa, and even some to Japan. Recently an inquiry from Holland led to repair of war scarred equipment that had weathered German bombings.

Maritime Commission Will Scrap Some Ships

Washington

• • • **To assist in** meeting the shortage of scrap metals the United States Maritime Commission has announced plans to scrap available war-damaged and overage merchant vessels.

The available supply of such vessels is limited, but the Commission is surveying the Reserve Fleet and other sources to determine what may be the ultimate number to be offered for scrapping. By law the Commission must sell through competitive bids, and it has been Commission policy to offer the vessels as promptly as availability was established. This has resulted in vessels being offered in relatively small lots from the several reserve fleets.

Decontrol for Foundry Coal

Washington

• • • **Sales of ground** coal used for foundry facings and dealer sales of bagged smithing coal as well as the service of bagging smithing coal have been exempted from price control. The ground coal exemption applies to both ground bituminous coal, also known as sea coal, and ground anthracite or car wheel mineral. OPA explained that ground coal is a highly specialized product produced by only about a dozen firms in the country for foundry facings and makes up only a small part of these firms' operations.

Weekly Gallup Polls . . .

Public Names Inflation Prime Problem Facing Nation

Princeton, N. J.

• • • **A year ago people** felt the big problems facing this country would be providing jobs for all and reconversion from war production. Today, a survey of the nation finds, the chief problem which people think will be tussled with in the months ahead are inflation and food shortages, according to George Gallup, director, American Institute of Public Opinion.

A year ago, twice as many felt that the Democratic Party was the one better suited to handle the nation's problems as had that opinion about the Republican Party. Today, voters are not so sure. Now about half who would pick either party choose the Democrats, the other half the Republicans, as better suited for the job.

The last year has of course not only seen a marked drop in confidence in the Democratic Party as the one better suited to solve the nation's problems. But it also has seen the proportion of voters preferring a Democratic to a Republican president in 1948 drop from 58 pct to 51 pct.

Public thinking on the problems ahead was gathered in a survey conducted as the first anniversary of the war's end approaches.

Voters across the country were asked:

"What do you think will be the most important problem facing this country during the next year?"

After inflation and food shortages come the maintenance of world peace and the conducting of our foreign affairs, and strikes and labor troubles as the big problems ahead.

In the order of frequency with which they were mentioned, here are the chief problems to face the United States during the next year, as the voters see them:

	Pct
Control of inflation (high prices, O.P.A.)	46%
Food and other shortages	20
Maintenance of peace and conduct of foreign affairs	10
Strikes and labor troubles	9
Housing	5
Jobs	4
Reconversion	3
Atom bomb	3
Miscellaneous	7
No opinion	4
	111*

**Total is more than 100 pct because some people gave more than one answer.*

A year ago, just before the war with Japan ended, Americans were already thinking ahead and worrying about what they felt would be the problems of peacetime America.

At that time, in reply to the same question used in this survey, the top four problems were: (1) jobs, (2) reconversion, (3) foreign affairs; maintaining permanent world peace, and (4) demobilization.

The second question in the same survey was:

"Which political party do you think can deal best with this particular problem?"

The replies today, as contrasted with a similar survey last fall when the same question was asked:

	Aug. 1945 Pct	TODAY Pct
Democrats	48	34
Republicans	23	35
No choice or undecided	29	31

•

• • • **One of the big** issues facing the United Nations is the acceptance or rejection of the U. S. plan for sharing information and control on atomic energy with other nations in the organization.

A special poll taken by the institute among citizens prominent in all fields — science, medicine, teaching, the clergy, banking, labor, industry, etc.—listed in *Who's Who in America*, finds that virtually eight out of every ten among them approve the idea of international control of the manufacture and use of atomic energy.

The plan referred to is the one put before the UN by Bernard Baruch as he took over the chairmanship of the UN's Atomic Energy Commission.

Price Control Heads Voters' List of Vexatious Problems Administration Must Resolve

o o o

Sentiment among the **Who's Who** list questioned was measured by replies to the following:

"In general, do you approve or disapprove of Bernard Baruch's plan for international control of the manufacture and use of atomic energy?"

Tabulation of replies shows

78 pct approving
13 pct disapproving
9 pct without opinion on the question

Comments of those in the survey were studied at length by institute analysts who find the following typifying comment:

Those disapproving of the Baruch plan:

(1) "We must keep the information and control it ourselves until the UN proves that it can accomplish its objectives. The Russians are irrevocably committed to the exploitation of crises. We've got to put a stop to that first.

(2) "We cannot give up control of this terrible force until world forces have become more stabilized and until the lines of a long peace are carefully laid out and definite.

(3) "The whole plan is too idealistic, and the best proof of that is Russia's reaction to the demand that the five powers give up their one-power veto."

Those approving of the Baruch plan:

(1) "It is the best plan so far offered on handling the problem of atomic energy. It fits the present situation realistically and workably.

(2) "Control of the sources of atomic power for military purposes belongs in the hands of a

(CONTINUED ON PAGE 149)

Shortages May Wreck Russia's New Five Year Plan

London

• • • **Despite the fact that Russia** has ample material resources, analysis of the latest Five Year Plan indicates that shortages of labor, technicians and equipment may make attainment of its high goals an impossibility.

The fourth Russian Five Year Plan published in March, 1946 (THE IRON AGE, May 23, p. 109.) stresses that priority is to be given to the restoration and development of heavy industry and rail transport, "without which the rapid and effective recovery of the entire national economy would be impossible." The target figures for production in 1950 are given as 27.9 million tons of steel ingots and castings and 21.4 million tons of pig iron. Other target figures in millions of net tons are:

Iron ore	44
Coal	275
Coke	33
Steel rail	1.48
Cast iron pipe	1.65

The ultimate goal was stated by Generalissimo Stalin in his broadcast on Feb. 4, 1946, to be 66 million tons of steel, 55 million tons of pig iron, and 550 million tons of coal, for which at least three Five Year Plans would be needed. In point of fact, the State Planning Commission was engaged in 1940 in the preparation of a fifteen year master plan designed to raise output per head of population in the principal commodities to the level obtained in the United States at that date.

It is not possible to compare these target figures with the present level of output, since current production figures are a closely guarded secret, especially in the case of steel, for which no government statistics have been published for any year since 1940. Soviet press references to production are rarely expressed in quantitive figures and are normally given in qualitative terms only of over or under fulfillment of plans, or in percentages of increase over some previous corresponding period for which no data are available, or over "prewar," which is all too vague and misleading to serve as a base.

It is, however, of some interest to compare these target figures with the actual production in prewar years and the estimates of production during the war years which are quoted in the report on iron and steel recently published by the U. S. Tariff Commission.

As regards the objective of attaining the 1940 level per head of population in the United States, it is interesting to note that even the target level of 66 million tons of steel quoted by Generalissimo Stalin for 1960 would still represent an output of only 500 lb per head of population compared with the 1940 figures of about 200 lb in the U. S. S. R., 700 lb in the United Kingdom, and 1000 lb in the United States.

This estimate is based on the assumption that the population of the U. S. S. R. (which is estimated to amount to 193 millions compared with the U. S. population of 136 millions) will continue its present rate of increase of three millions per year.

From the purely raw material standpoint there would seem to be no reason why the 1950 target of 27.9 million tons of steel, or even the 1960 target of 66 million tons should not be achieved, for the U. S. S. R. has potentially greater resources even than the United States, except in coal. Indeed it has been estimated that over half the resources of iron ore in the world are located in the U. S. S. R.; and a great proportion of these resources consist of high grade ore.

The two main bottlenecks in the way of achievement of the new Five Year Plan in fact appear not to be raw material resources but the supply of equipment and of skilled labor.

During the war, the Germans singled out industrial workers for deportation to Germany, where forced labor and bad conditions considerably reduced their numbers and physical efficiency. To offset wartime losses, and to provide for new industrial expansion, it is estimated that 20 million new workers will be needed. There is no surplus available from the farms. In fact, due to the extensive destruction of farm equipment, especially tractors, more manual labor is needed in food production than ever before.

The labor bottleneck in industry is being eased to some extent by the rapid release of technicians and skilled workers from the armed forces, regardless of their demobilization class.

According to the interesting report made by the Iron & Steel Trades Confederation's delegation which visited the U. S. S. R. in July and August, 1945, output per manhour is considerably lower than in Great Britain, and a larger number of men are employed than

1950 Production Targets

	Millions of Net Tons			Area, Sq Mi	Population (approx.)
	Coal	Pig Iron	Steel		
Russian S.F.S.R.	156.09	10.45	17.6	7,636,125	110,451,900
Ukrainian S. S. R.	94.71	10.67	9.68	180,000	32,800,000
Byelo-Russian S. S. R.	.....	.....	.....	49,041	5,440,000
Uzbek S. S. R.	1.21	.....	0.09	66,400	6,300,000
Kazakh S.S.R.	18.04	.....	0.08	1,000,000	6,000,000
Georgian S.S.R.	2.64	0.33	0.19	25,470	2,135,033
Azerbaijan S.S.R.	.....	.....	0.19	33,570	2,463,098
Lithuanian S.S.R.	.....	.....	.....	19,000	2,442,000
Moldavian S.S.R.	.....	.....	.....	20,000	4,000,000
Latvian S.S.R.	.....	.....	.....	25,000	2,000,000
Kirghiz S.S.R.	1.76	.....	.....	75,000	1,500,000
Tajik S.S.R.	0.44	.....	.....	56,108	2,000,000
Armenian S.S.R.	.....	.....	.....	15,065	1,339,969
Turkmenian S.S.R.	0.06	.....	.....	188,610	1,270,000
Estonian S.S.R.	.....	.....	.....	18,630	1,122,000
Karelo-Finnish S.S.R.	.....	.....	.....	16,000	470,000
Total	274.95	21.45	27.83	9,424,019	181,734,000

in comparable British plants. The delegation reports, however, that the Russian workers seem as apt as the British in steelmaking processes and handling tools. Equipment is partly antiquated and partly modern, but both workers and management seem to attach little importance to the care of the machine, which receives only a minimum of maintenance attention.

Under the new plan, scrap sorting points and pig breaking departments of iron and steel plants are to be modernized, and a number of new mechanical plants for handling scrap are to be built. Concentration of low grade ores is to be developed, production of concentrates increased, and preparation of raw materials improved to provide charges of more regular composition. Laborious processes in blast furnaces, openhearth and rolling mill operations are to be further modernized.

Great emphasis is to be placed on the development of the machine tool industry, which was relatively undeveloped before the war. The number of types produced will be increased from 500 to 1000. The target for the 1950 output of iron and steelmaking equipment is fixed at 113,190 tons. The main items of plant, etc., to be constructed and put into operation in the five-year period and their nominal capacities in net tons are as follows:

Iron ore mines	38,940,000
63 Coke batteries	21,010,000
45 Blast furnaces	14,080,000
165 Openhearth furnaces 15 Converters 90 Electric furnaces	17,820,000
104 Rolling mills	12,870,000

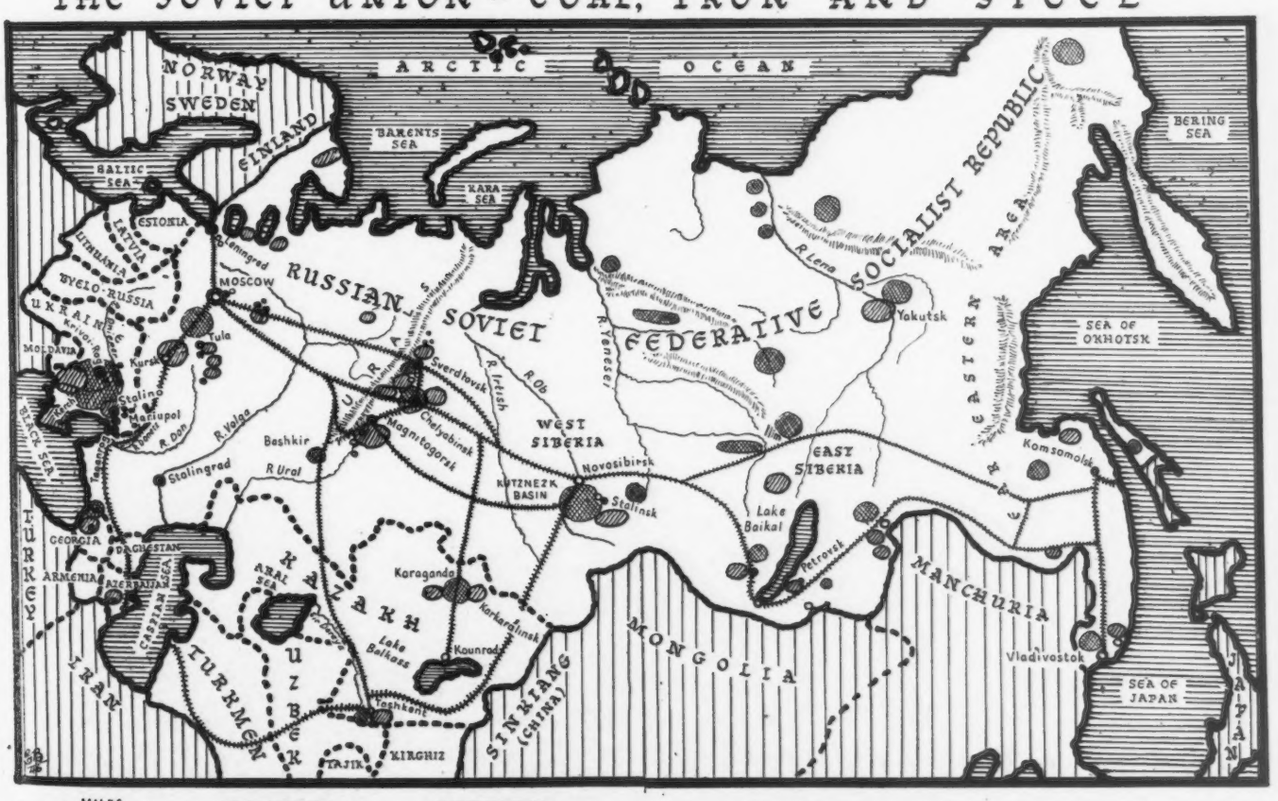
It is doubtful whether the U. S. S. R. can put the new Five Year Plan into effect with her own resources alone, whether material or technical. Much of her existing modern equipment is of foreign origin. Britain supplied a certain amount of rolling equipment and forging presses in the years just prior to the war. The coking plants at Stalinsk, Magnitogorsk, Petrovsk and Voroshilev, stated to be among the most modern in the world (annual capacity of the latest installed is as high as 1,430,000 tons) were built under the supervision of Koppers Co., Pittsburgh, while rolling mills at Magnitogorsk, Kuznetsk and other centers were also installed by American firms. This dependence will, however, be considerably less than previously.

It may be assumed that every effort will be made to produce as much equipment as possible at home, and to supplement this with the maximum quantity of equipment that can be obtained from Germany as reparations. It has been estimated that the equipment claimed from western Germany under the Berlin agreement, plus the 3.3 million tons capacity in the Soviet zone, would place German steelmaking capacity of 7,700,000

Russian Expansion

• • • The latest available data on Russia's plans for expansion of its steel industry are presented here through the cooperation of the British Iron & Steel Federation, which compiled the report. Pig iron, coal, ore, coke, steel making and steel plant equipment are discussed, with an analysis of the plan's possible effect on foreign markets.

THE SOVIET UNION - COAL, IRON AND STEEL



Courtesy: British Iron & Steel Federation.

BLASTED BY NAZIS: *Retreating before the Red Army, German invaders blew up the blast furnaces at Kosogorsk. According to Soviet sources, this view shows these furnaces after their reconstruction which started immediately following liberation of the town.*

tons per annum in Russian hands.

Many plants are to be rebuilt in the evacuated areas, but one of the highlights of the new plan will be the further development of the industrial areas farther east. Strategic, political and cultural motives compel the government to pursue this policy.

The vulnerability of the Ukraine was foreseen during the 1930's, and a study of constructional activities during this period shows the U. S. S. R. reducing her economic dependence on the Ukraine by the erection of new plants in the Urals and the sinking of mines farther away from western borders. By 1938, the Urals held second place in pig iron and steel, third place in coal production, and fourth in engineering, while the output of rolled products increased four times between 1927 and 1938. The industrial output of the Urals is now probably as great as, if not greater than, any other region.

Further light is thrown on the details of the planned developments by the separate particulars given for each of the 16 Soviet Republics, although the value of this subdivision is limited by the fact that one of these Republics (the Russian Soviet Federative Socialist Republic) alone accounts for 75 pct of the total area and over 55 pct of the total population of the U. S. S. R. There is therefore no further breakdown available of the steel production aimed at in this area, which amounts to 17.6 million ingot tons out of the total output planned for the U. S. S. R. of 27.9 million ingot tons. A further 9.6 million ingot tons, or practically all the remainder of the production, is accounted for by the Ukrainian Soviet Socialist Republic, which while representing only 2 pct of the total area contains much as 20 pct of the total population.

The Russian Soviet Federative Socialist Republic includes (1) the formerly occupied areas of the West; (2) the Leningrad area; (3) the Kursk area; (4) the Urals district, of which Magnitogorsk is the center; (5) Kuznetsk and the Stalin works, and (6) the coal and iron fields in the Far East.

Under the new plan, production of iron and steel equipment in these areas is to amount to 73,370 tons in 1950. New equipment to be built and put into operation includes 13 blast furnaces with capacity for 3,630,000 tons pig iron; steel units of 7,480,000 tons capacity; and 35 rolling mills of 5,060,000 tons total capacity.

(1) In the formerly occupied areas of the West, the iron and steel plants are to be restored and new metallurgical centers set up. New construction will include six blast furnaces of 1,100,000 tons aggregate capacity; steel units of 1,540,000 tons capacity; and nine rolling mills of 550,000 tons capacity. Coal mines for the production of 28.6 million tons of coal per yr are to be started.

(2) In the Kursk magnetite ore fields, further mines are to be put

(CONTINUED ON PAGE 151)

U.S.S.R. Production Statistics

	Millions of Net Tons		
	Coal	Pig Iron	Steel
1913	32.0	4.6	4.8
1929	44.0	4.7	5.5
1933	77.9	7.8	7.4
1934	102.8	11.5	10.6
1935	114.1	13.8	13.7
1936	135.0	15.7	18.1
1937	134.8	15.9	19.5
1938	146.1	16.0	19.8
1939	160.4	16.7	20.6
1940	181.0	16.5	20.1
1941	188.1	14.3	16.6
1942	....	7.7	12.2
1943	....	11.1	13.3
1944	....	16.8	15.4
1945	....	18.8	19.8

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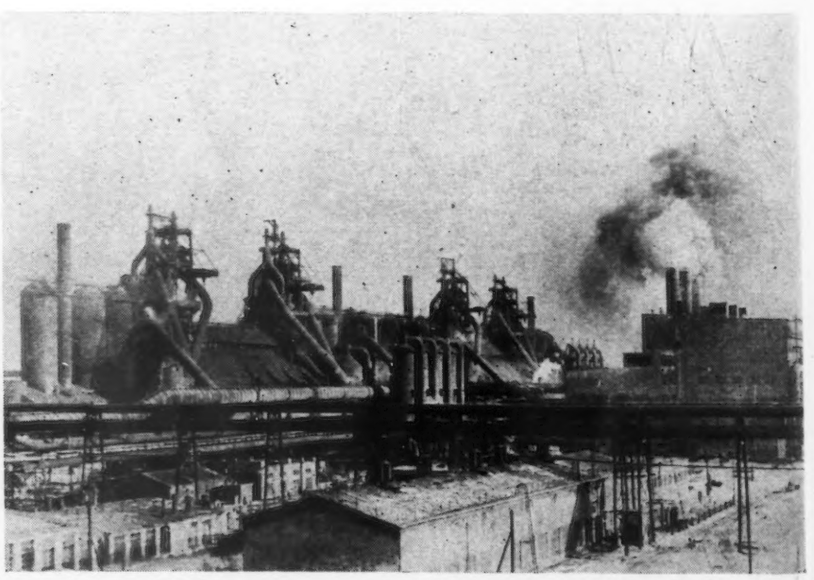
UNTOUCHED BY WAR: *General view of the blast furnaces at Magnitogorsk, east of the Urals. Both the coking plant and rolling mills here were made in the U. S. A.*



AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1945

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	*Net tons	*Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity		
January	6,469,340	90.5	379,062	76.0	355,910	76.8	7,204,312	88.8	1,626,256	4.43
February	5,968,326	92.4	347,227	77.1	337,212	80.6	6,652,765	90.8	1,663,191	4.00
March	6,927,939	96.9	398,351	79.8	379,639	81.9	7,705,929	95.0	1,739,487	4.43
1st Quarter	*19,365,605*	*93.3*	*1,124,640*	*77.6*	*1,072,761*	*79.7*	*21,563,006*	*91.5*	*1,676,750*	*12.86*
April	6,541,627	94.5	372,952	77.2	375,308	83.6	7,289,887	92.8	1,699,274	4.29
May	6,664,117	93.2	402,100	80.6	383,450	82.7	7,449,667	91.8	1,681,640	4.43
June	6,129,763	88.5	379,807	78.6	330,952	73.7	6,840,522	87.1	1,594,527	4.29
2nd Quarter	*19,335,507*	*92.1*	*1,154,859*	*78.8*	*1,089,710*	*80.0*	*21,580,076*	*90.6*	*1,658,730*	*13.01*
1st 6 Months	*38,701,112*	*92.7*	*2,279,499*	*78.2*	*2,162,471*	*79.9*	*43,143,082*	*91.0*	*1,667,688*	*25.87*
July	6,318,975	88.6	381,832	76.7	284,764	61.6	6,985,571	86.3	1,580,446	4.42
August	5,172,344	72.3	347,088	69.5	215,885	46.6	5,735,317	70.7	1,294,654	4.43
September	5,435,799	78.7	352,847	73.2	193,829	43.3	5,982,475	76.3	1,397,775	4.28
3rd Quarter	*16,927,118*	*79.9*	*1,081,767*	*73.1*	*694,478*	*50.5*	*18,703,363*	*77.8*	*1,424,475*	*13.13*
9 months	*55,628,230*	*88.4*	*3,361,266*	*76.5*	*2,856,949*	*70.0*	*61,846,445*	*86.6*	*1,585,806*	*39.00*
October	5,146,787	72.0	242,122	48.5	207,867	44.8	5,596,776	69.0	1,263,381	4.43
November	5,641,308	81.5	358,664	74.2	200,494	44.7	6,200,466	78.9	1,445,330	4.29
December	5,523,277	77.4	343,266	68.9	191,394	41.4	6,057,937	74.8	1,370,574	4.42
4th Quarter	*16,311,372*	*76.9*	*944,052*	*63.8*	*599,755*	*43.6*	*17,855,179*	*74.2*	*1,358,842*	*13.14*
2nd 6 months	*33,238,490*	*78.4*	*2,025,819*	*68.5*	*1,294,233*	*47.1*	*36,558,542*	*76.0*	*1,391,646*	*26.27*
Total	71,939,602	85.5	4,305,318	73.3	3,456,704	63.4	79,701,624	83.5	1,528,608	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,614,338 net tons open hearth, 112,658 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,636 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 84,171,590 net tons, Bessemer 5,874,000 net tons, Electric 5,455,890 net tons, total 95,501,480 net tons.

*Revised January through December, 1945.

YEAR 1946

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
February	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st Quarter	*10,775,732*	*53.8*	*597,366*	*47.0*	*398,520*	*29.4*	*11,771,618*	*51.9*	*915,367*	*12.86*
April	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
* June	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
* *2nd Quarter*	*14,178,712*	*69.9*	*690,750*	*53.7*	*688,074*	*50.1*	*15,557,536*	*67.9*	*1,195,814*	*13.01*
* *1st 6 months*	*24,954,444*	*61.9*	*1,288,116*	*50.4*	*1,086,594*	*39.8*	*27,329,154*	*59.9*	*1,056,403*	*25.87*
† July	6,009,670	87.3	365,384	83.6	223,810	48.0	6,598,864	84.7	1,492,956	4.42
August										4.43
September										4.28
3rd Quarter										*13.13*
9 months										*39.00*
October										4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised.
† Preliminary figures, subject to revision.

Truman Approves Order Allowing Unionization of J & L Mine Foremen

Washington

• • • **Approved by President** Truman, the National Wage Stabilization Board on Aug. 7 issued an order covering 136 unionized foremen and supervisors at four government-seized Jones & Laughlin Steel Corp. coal mines. The order was issued in the face of a petition filed by J&L in the United States Court of Appeals here, seeking an injunction against a contract made between John L. Lewis' UMW and Admiral Ben Moreel, Federal Coal Mines Administrator. This government contract is the first of the kind ever made with the union and has excited widespread interest as a probable forerunner to unionization of supervisory workers in other government seized mines. Private operators have insisted that the government is without authority to make such contracts affecting privately owned mines.

The board order, which sets up wage and working conditions, was issued under the War Labor Disputes Act. Industry members of the board dissented to all clauses of the order, except one which provides a $1.85 daily wage increase, and opposed approval of the contract. They contended that the May 27 certification creating the group as the bargaining agent for the employees through the United, Technical and Supervisory Employees' District 50, was before the court for determination as to its legality.

Public members of the board who with union members constituted the majority in the proceedings, said it was legally bound to accept the USRB certification unless it is reversed by "competent authority." It was added that the USRB (Wagner) Act does not contemplate that certifications should be considered as "worthless or inconclusive" while being tested in court.

Coming Events

Sept. 10-14 American Chemical Society, exposition, Chicago.

Sept. 11-12 Society of Automotive Engineers, national tractor meeting, Milwaukee.

Sept. 16-20 Instrument Society of America, first conference and exhibit, Pittsburgh.

Oct. 1-4 Assn. of Iron & Steel Engineers, Iron & Steel Exposition, Cleveland Public Auditorium, Cleveland.

Oct. 3-5 National Electronic Conference, Chicago.

Oct. 3-5 Society of Automotive Engineers, aeronautic meeting and display, Los Angeles.

Oct. 9-11 Porcelain Enamel Institute, University of Illinois.

Oct. 10-12 American Society of Tool Engineers, semi-annual convention, Pittsburgh.

Oct. 16-19 Electrochemical Society, fall congress, Toronto.

Oct. 28 American Institute of Steel Construction, annual convention, Coronado, Calif.

Oct. 28-30 American Gear Manufacturers Assn., semi-annual meeting, Chicago.

Oct. 29-Nov. 1. Refrigerator Equipment Manufacturers Assn., exposition, Cleveland.

Nov. 7-8 National Founders Assn., New York.

Nov. 17-22 American Welding Society, annual meeting, Atlantic City, N. J.

Nov. 18-22 National Metal Congress and Exposition, Atlantic City, N. J.

Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.

Dec. 2-7 National Power Show, New York.

Youngstown Co. Objects To NLRB Mine Election

Youngstown, Ohio

• • • **Youngstown Sheet & Tube** Co. has announced that it has formally objected to the conduct of an election by the National Labor Relations Board among supervisory employees of its wholly-owned subsidiary, Buckeye Coal Co., at the Nemacolin mine, Nemacolin, Pa.

On July 31, the Buckeye Coal Co. received notification from the NLRB that the Board would conduct an election among Buckeye's foremen at Nemacolin on August 8. According to Youngstown Sheet & Tube Co., this notification was given without the Board's first having afforded the company an opportunity to be heard.

On August 5, Buckeye Coal Co. filed motions with the regional office of the NLRB in Pittsburgh, protesting the Board's action in proceeding against the company now because of its uncertain legal status as "employer" with the government in possession of the mine; lack of legal authority on the part of the Board to aid the unionization of foremen and other supervisory officials, all of whom the company regards as part of its management's forces.

Approximately 1400 employees work at this mine and its output of approximately 9000 tons of coal per day supplies coal for the operation of The Youngstown Sheet and Tube mills in the Youngstown district.

Buckeye's Nemacolin Mine has been under government operation since it and other coal mining operations were seized by the Federal government on May 22, to break the strike of John L. Lewis' United Mine Workers, then in effect.

The London ECONOMIST

After UNRRA?

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

° ° °

WITH UNRRA meeting for its Fifth Council Session in Geneva it can look back on an immense achievement. By mid-May this year 10 million tons of goods, worth over $1 billion, had been shipped to various European countries as follows (figures to end of April, 1946):

	Gross Tons
Italy	2,558,556
Greece	2,560,808
Jugoslavia	1,670,756
Poland	924,502
Czechoslovakia	761,145
Ukraine	178,881
Austria	132,574
Albania	107,683
Byelorussia	73,396
Dodecanese	7,410
Hungary	1,197
Finland	805
UNRRA Operations	16,415
Total	8,994,128

Of this total 4,713,799 tons was food, 280,734 tons clothing, textiles and footwear, 711,492 tons agricultural rehabilitation material, and 3,250,616 tons industrial rehabilitation material (of which 2,440,732 tons were coal and liquid fuel) and 37,487 tons medical supplies.

The total dollar expenditure contemplated by Dec. 31, 1946, when UNRRA ceases functioning, is $2,337 million, the greater part of which should have been spent by July this year. This sum has been allocated as follows:

Total UNRRA Expenditures on Relief Supplies
(Millions of Dollars)
to June 30, 1946

Albania	25.6
Austria	53.9
Byelorussia	53.4
Czechoslovakia	241.6
Dodecanese	3.0
Greece	316.8
Hungary	3.3
Italy	359.4
Poland	375.0
Ukraine	161.9
Yugoslavia	369.3
Total	1,963.2

In six countries—Italy, Greece, Yugoslavia, Poland, Albania and Czechoslovakia—UNRRA alone has prevented starvation. Only in Austria of the countries for which UNRRA is responsible is there outright starvation—during May the daily calorie level in Vienna fell to 950. And Austria's plight is due not to any UNRRA failure, but to the absence of any high-level planning in the allocation of food supplies. Other relief needs have also been fairly adequately met. Sufficient clothing, mainly in the form of textile raw materials, has been supplied, though footwear and leather supplies have not been adequate. Medical supplies and hospital units, however, ordered well in advance, have been in general large enough.

IN agricultural reconstruction, however, UNRRA's work has barely begun. This is mainly through lack of money and delay in ordering. Yet everywhere draft power is still the main factor limiting agricultural recovery. Nevertheless, in the chaotic transport conditions of last autumn it might not have been possible to use much larger supplies than UNRRA could provide; in some countries certainly utilization was not as effective as it might have been, owing to the lack of skilled mechanics and of repair equipment. Nor was it possible to put in large numbers of livestock, in view of the acute shortage of fodder. Moreover, the recovery of European agriculture depends largely on the gradual improvement of administration and development of expert services. But it is only as supplies come in that the right methods of use and distribution can be found and the economic structure become capable of absorbing them.

Nor has industrial reconstruction really started. In Yugoslavia, where UNRRA is generally admitted to have been most successful, the transport system is still working far below capacity. The heavy industries are hampered by lack of fuel, and can only produce small quantities of the steel needed for bridge repairs. Recently indeed more coal has arrived on UNRRA's behalf from the United States, and exports from Poland via Hungary have also been arranged. In Poland, in fact, coal output now exceeds the prewar level and industrial recovery is well under way, though limited by lack of transport. Yet to enable industry to recover, another year of UNRRA operations is needed, in both Yugoslavia and Poland, as well as in every other country served by UNRRA.

NEITHER Greece, nor Poland, nor Italy, nor Austria, is yet able to pay for minimum food imports by exports. Alone in Central Europe, Czechoslovakia, with its industries comparatively unaffected by war, and receiving supplies of raw materials from Russia, should be able to pay for its food imports next year. But as things stand now, the others face certain starvation. UNRRA food imports to Greece, for example, are to cease after the present harvest. Subsequent food imports might be paid for, at least in part, if Greece could sell its two years' tobacco crop, which at present finds no market, although tobacco is the most valuable means available in Europe at the moment of extracting grain from peasants. The Greek tobacco crop, sold through government channels in Austria and Hungary direct to the farmers' organizations in return for food, would enormously relieve the food shortages of Budapest and Vienna, where food prices are now measured in terms of the purchasing power of cigarettes in calories. But if UNRRA ceases to exist, there may well be no mechanism for disposing of the crop.

Above all, in Austria, the bitter heart of European chaos, there will be starvation next year, as this,

(CONTINUED ON PAGE 150)

CPA Formally Establishes Iron And Steel Ratings for Fourth Quarter

Washington

• • • **Re-establishment of the** CC preference rating system (PR 28) on steel and iron castings for fourth quarter delivery was officially announced by CPA on Aug. 7. At the same time, CPA announced a special program designed to provide sufficient steel for fourth quarter production of specified housing items.

The action, taken over industry protests, permits manufacturers to apply for CC ratings which will aid their procurement of minimum amounts of steel and iron castings. CPA says that the improved rate of steel production and anticipated improvement in the output of iron castings makes it possible to return to the system of CC ratings on these materials for delivery after Sept. 30.

All ratings (except AAA) in the hands of manufacturers at the time of suspension, Jan. 21, 1946, are now permanently revoked and new applications must be filed on Form CPA 541-A.

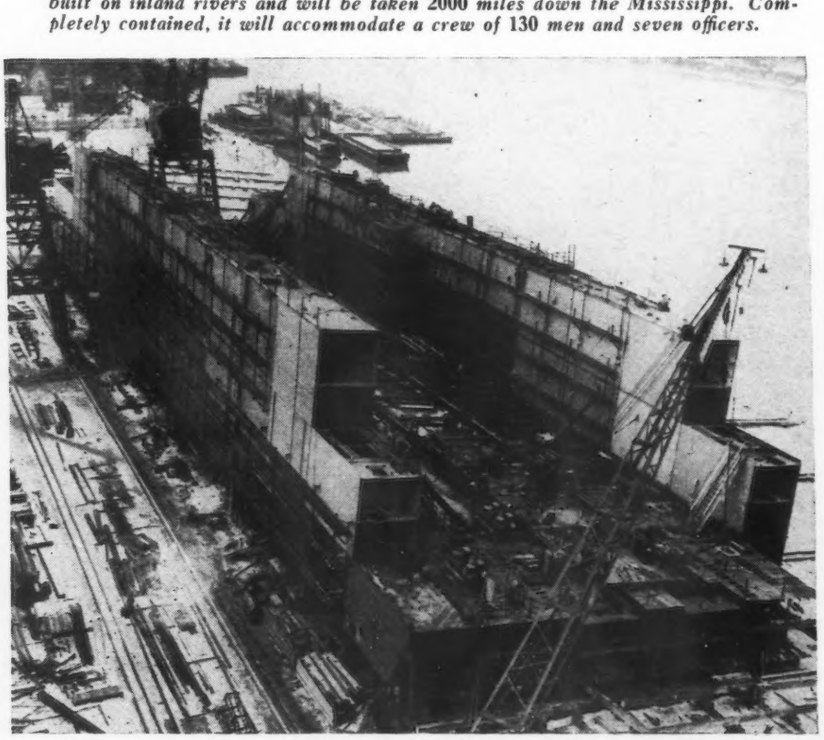
Expiration of the emergency procedure, under Directions 12 and 13 to Order M-21, at the end of the third quarter made it necessary for CPA to further amend PR 28. This additional amendment provides for the assignment of CC ratings for steel and castings to make certain items needed in the veterans' housing program in the fourth quarter. This list of items (THE IRON AGE, Aug. 8, p. 104 C) has been expanded to include the following types of screwed pipe fittings: gray cast recessed drainage, 2 in. and under; gray cast steam fittings, 3 in. and under; and malleable fittings, including unions, 2 in. and under.

The housing items will require a maximum of about 150,000 tons of light gage sheet during the fourth quarter. Separate applications for ratings on the listed housing had to be filed with CPA on Form CPA-4491, on or before Aug. 15, to insure fourth quarter delivery. CC ratings for these items will not normally be assigned to increase inventories.

Not more than 45 pct of the iron castings or steel for which a CC rating is granted to a manufacturer for the fourth quarter may be rated for delivery in any one month. Moreover, a CC rating assigned on Form 4491 may be used only to place orders with the manufacturer's usual source of supply as indicated on that form, and in accordance with his usual purchase pattern, unless otherwise authorized by CPA.

To validate the carry-over of self-certified orders placed upon the mills for September delivery of steel or castings, but upon which delivery cannot be made in September, CPA has issued Direction 14 to M-21, which provides that such orders shall be treated as CC orders for the month of October only.

PORT OF PITTSBURGH: *This ARD-33 floating drydock for the Bureau of Ships, was launched Aug. 10 by Dravo Corp., Pittsburgh. It is the largest vessel ever built on inland rivers and will be taken 2000 miles down the Mississippi. Completely contained, it will accommodate a crew of 130 men and seven officers.*



New Price Set Up For Brand-Name Products

Washington

• • • **A forthcoming** action planned by OPA will remove from the manufacturing classification those who sell brand-name industrial machinery, equipment and related parts who do not make the products thus sold.

A new pricing procedure will be established. Sellers will be permitted to apply Mar. 31, 1946, markups to these items but must report the new prices to OPA. If other agency action is not taken within 15 days, the new prices are automatically approved.

In the past, such sellers have been required to absorb increased costs passed on to them by their contracting manufacturers.

No WAA Edge for Brokers

Washington

• • • **WAA has ruled** that persons acting as brokers cannot exercise a priority in buying surplus property. It defined brokers as persons whose business it is to bring together buyers and sellers; who do not normally take title or possession; and who are generally agents of one of the parties to a transaction.

Dealers, jobbers and distributors, however, may qualify for a veteran's or other priority if satisfactory evidence shows that they are not merely seeking to acquire property for consignment to other persons or firms, a WAA instruction to its field directors pointed out.

Kaiser Calls Critics "Scandalmongers" Who Deal in "Half Truths"

Oakland, Calif.

• • • **Henry J. Kaiser** answered his critics who have been demanding Congressional investigations of his war record by appealing to the American people, claiming that "scandalmongers" and their "half-truths" avoid the facts of his wartime activities. He said that the hearings on the entire shipbuilding industry, including Kaiser, have been ignored. "It would appear that these scandalmongers are not only interested in character assassination, but were using my name and war record to further their personal publicity," Mr. Kaiser said.

Mr. Kaiser attacked the steel industry directly, claiming that steel producers during the war failed to provide the necessary steel for Kaiser's ships because they had shipyards of their own. Consequently, Kaiser Co. had to build its own steel plant, and produced over a million tons of steel in a little more than two war years from a plant with a rated capacity of about 750,000 tons a year.

He explained that the total RFC loans on the Fontana plant were: Total plant cost, $94,155,000; Eagle Mountain ore purchase, $1 million; and working capital, $16,650,000, or a total of $111,805,000. Of this, $17,780,000 have been paid to the account principal and the interest. Additional monies have been earmarked and available for Fontana payment to bring the total repayment to RFC on the plant to $44 million, of which $36 million will apply to principal payments and $8 million to interest payments.

When queried as to what he considered a fair adjustment on the Fontana loan, Mr. Kaiser stated that his fixed charges per ton capacity should be the same as his competitors or the average for the industry, especially as that of Geneva. He said that he was being "held up" on the Fontana loan and financing and is at the same time accused of favoritism from government agencies. He stated that Fontana has never been in default in its payments or commitments and that the plant is at present earning interest and therefore must pay interest on the RFC loan.

Mr. Kaiser also claimed that he borrowed $111 million and paid 4 pct interest on it, and produced more steel plate during the war than "the corporation" did with the $200 million worth of government money in Utah on which no interest was paid and which they have now obtained at 20¢ on the dollar. Fontana is now operating three shifts on plates, structural, and bars. Its plate capacity is booked well into the summer of 1947.

Mr. Kaiser stated that the percentage profit on returns of the Kaiser interests were low during the war. He claimed that in building Fontana no purchases of equipment were allowed from those suppliers furnishing the major equipment to Bethlehem and U. S. Steel. In return for certain past help, Mr. Kaiser said that Fontana has been furnishing Bethlehem with thousands of tons of pig iron, and to Republic's subsidiary in California (probably meaning aircraft plants), Fontana has furnished nearly 10,000 tons of steel within the last year.

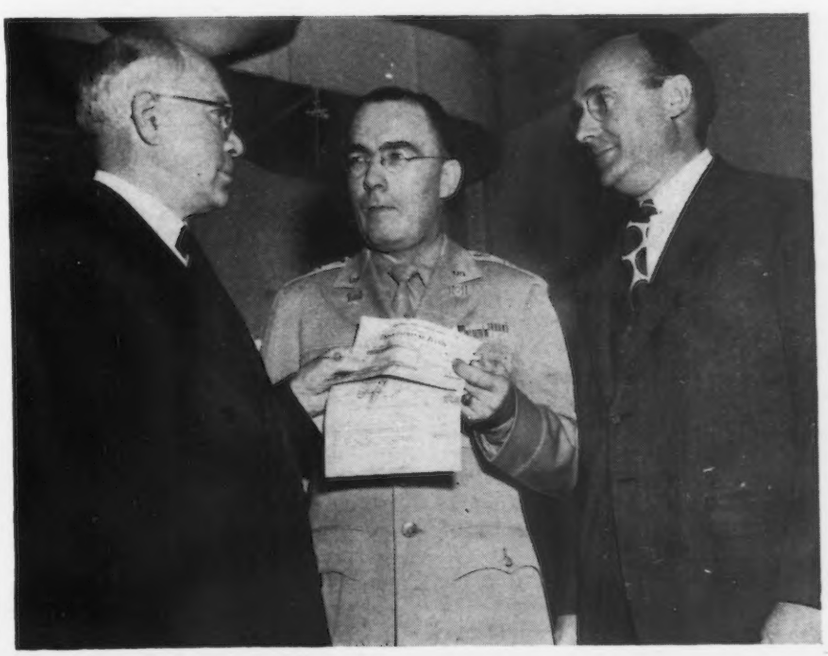
Brass Screw Machine Prices Increase 1.9 Pct

Washington

• • • **To relieve** immediate hardship of manufacturers and permit continued production, an interim additional increase of 1.9 pct in the ceiling prices of screw machine products made entirely of brass was announced on Aug. 7, by the OPA. Effective Aug. 8, the increase affects only screw machine products made of brass, which total about 25 pct of all screw machine products, OPA said. It takes into consideration only the increased cost of brass rod and wire used in making these products.

The new increase is in addition to the 13.6 pct interim increase in the maximum sales prices of all screw machine products granted on Apr. 19. As explained when this general increase was given, a survey of the industry is being made but adequate reports have not yet been received to permit final action.

SEAL DEAL FOR U. S. STEEL: *Max D. Howell, vice president and treasurer, U. S. Steel Corp., left, hands checks totaling $77,490,375.44 to Brig. Gen. John J. Obrien of WAA in payment for the government steel properties recently bought by the corporation. Included were three checks totaling $12,242,059.22 covering initial payment and accrued interest on the Geneva steel plant. Merrill Russell, secretary, Geneva Steel Co. is at the right.*



Industrial Briefs . . .

• CHANGE OF NAME—As from July 1 the name of British Tube Mills (Export) Ltd., the export sales organization of the British Tube Investments Group's tube-producing companies, has been changed to T. I. (Export) Ltd., with a view to establishing a closer and more easily recognizable identity with the T. I. Group and to cover as required its various light engineering ramifications.

• BUILDING PLANT—The Cleveland Tapping Machine Co. has begun construction of a new plant at Hartville, a suburb of Canton, Ohio. Plans call for a building which will enable the company to double its production facilities and the site was selected to permit future expansion.

• TWO ACQUISITIONS—The Barium Steel Corp. acquired control of the Wiley Equipment Co., Port Deposit, Md., and the Wiley Mfg. Co., Mountville, Pa., manufacturers and fabricators of cranes, barges, hoisting and loading equipment. The operations of both companies will be coordinated with and supplement the activities of the Clyde Iron Works, Duluth, Minn., a subsidiary of Barium.

• NEW CHAPTER PRESIDENT — Lester L. Lessig, contracting engineer, Bethlehem Steel Co. has been made president of the Philadelphia section of the American Society of Civil Engineers.

• RED ORE CONTRACT — Rust Engineering Co., Pittsburgh and Birmingham, has been awarded a contract to dig red ore reclamation tunnels for the Tennessee Coal, Iron & Railroad Co. at its Wenonah red ore mine. The contract is valued at approximately $125,000.

• BUYS PLANT ADDITION—William B. Pollock Co., Youngstown, has purchased the 16,500 sq ft plant addition built by the Federal Government during the war for $60,000, according to an announcement by the War Assets Administration. The company produces blast furnace parts and other heavy steel mill plant fabrications including parts for oil and processing industries.

• BUYS ALLIANCE MFG. CO.—Purchase of Alliance Mfg. Co., Alliance, Ohio, one of the nation's largest producers of fractional horsepower electric motors for radio and electronic control devices, and Precision Mfg. Co., Bergholz, Ohio, by Melvin B. Hott, an investment broker, and a group of Cleveland associates, has been announced. The plants, formerly owned by Owen L. Lewis and associates of Alliance, will continue operations with present personnel with the exception of Mr. Lewis, Mr. Hott said.

• ACQUISITION—Control of the Warsaw Elevator Co., Warsaw, N. Y., has been acquired by Arthur B. Treman, Ithaca businessman, and a group of New York City investors from E. J. McEvoy and H. Floydburd. Terms of the transaction were not disclosed.

• COMPRESSOR ORDER—The Buffalo plant of the Worthington Pump & Machinery Corp. has received an order for $3,250,000 of gas-engine compressors from the National Gas Pipeline Co. of Chicago. Works manager Austin C. Ross said production of the equipment will start this fall and the order will require more than a year to complete.

• EXPANSION PROGRAM—Wyandotte Chemicals Corp., Wyandotte, Mich., plans to spend $25 million in additions and enlargements to its present plants within the next 18 months. One phase of Wyandotte's expansion in the organic field will be the erection of the new synthetic detergent plant, and another unit will supply materials to the commercial chemical field.

ICC Says Roads Need Not Furnish Spotting Service at Large Plants

Washington

• • • **The Interstate Commerce** Commission has interpreted the terminal switching tariff published by railroads in Official Classification, effectve Jan. 1, as one which in no way enlarges the obligation of railroads to provide spotting services at industrial plants with extensive and complicated track layouts.

This finding was made in the Commission's recent report on a situation at the Argo, Ill. plant of the Corn Products Refining Co., which has about 23½ miles of track covering 200 acres. The decision has been given wide significance because it is taken to indicate that it applies to other like plant track systems.

The tariff grew out of the Commission's various reports in the terminal service phase of the investigation of railroad practices (Ex-parte 104, part 2). It was an undertaking of the railroads to publish switching arrangements in accord with principles laid down by the Commission. Provision is made in the tariff for charges in addition to line haul rates for spotting services where the switching railroads encounter delays.

The Commission's determination in effect is that the delays contemplated by the tariff are temporary in nature. Thus the tariff's offer of interrupted spotting services at the published charges is not applicable where delays or interferences or interruptions "are inherent in or arise repeatedly out of industrial operations or the inadequacy or complexity of plant tracks or facilities."

OPA Raises Bushing Prices

Washington

• • • **Effective Aug. 8,** manufacturers of nonferrous bushings and journal and sleeve bearings are permitted ceiling increases ranging from 1 to 2½¢ a lb in order to compensate for the recent casting increase by the same amount. While relatively few of these items are handled by jobbers or dealers, all resellers are permitted the percentage pass-through of the increased cost.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

10,000 Tons, Chicago, mill building, Inland Steel Co., to Bethlehem Steel Co., Bethlehem, Pa.

4000 Tons, State of Maine, 40 bridges for state highway project to American Bridge Co., Pittsburgh.

2270 Tons, Mitchell, Ill., bridge to Stupt Bros., St. Louis, Mo.

800 Tons, Lincoln, Ill., manufacturing building, Lehn & Fink Co., to American Bridge Co., Pittsburgh.

500 Tons, Royalton, Ill., coal treating plant, Franklin County Coal Corp., to American Bridge Co., Pittsburgh.

488 Tons, El Monte, Cal., new glass plant, Ball Bros. Co. of California, Inc., storage building and warehouse, through the Austin Co. to Bethlehem Pacific Coast Steel Corp., San Francisco.

260 Tons, El Monte, Cal., furnace building, Ball Bros. Co. of California, Inc., through the Austin Co., to Fort Pitt Bridge Co.

252 Tons, Tracy, Cal., two highway bridges across Paradise Cut, through Stockton Construction Co., to California Steel Products Co.

• • • **Fabricated steel inquiries** this week included the following:

5000 Tons, New York, Abraham Lincoln housing project.

2200 Tons, Pensacola, Fla., box factory, Alabama Pulp & Paper Co.

2000 Tons, Mobile, Ala., building, Waterman Steamship Co.

1800 Tons, Cleveland, department store building, Halle Bros.

1700 Tons, Brilliant, Ohio, power plant, Ohio Power Co.

1000 Tons, Kingman, Ariz., Davis Dam construction trestle, Utah Construction Co., general contractor.

600 Tons, Big Creek, Cal., penstock, Southern California Edison Co.

600 Tons, Chicago, building, Edith Building Corp.

500 Tons, Natchez, Miss., board mill, Ford, Bacon & Davis Co.

400 Tons, Odair, Wash., warehouse building, U. S. Bureau of Reclamation, Grand Coulee Dam.

390 Tons, Auburn, Cal., bridge at North Fork of American River, California Div. of Highways, Sacramento, bids open Sept. 4.

201 Tons, Mt. Hood National Forest, Ore., Hillockburn Road bridge, Public Roads Administration, Portland, bids open Aug. 20.

175 Tons, Compton, Cal., addition to main office building, Southern California Telephone Co.

• • • **Reinforcing bar awards** this week included the following:

2250 Tons, State of Maine, state highway project to Bancroft & Martin Rolling Mill Co., Portland, Me.

285 Tons, Los Angeles, Ford J. Twaits office building, through T-S Construction Engineers, Inc., to Blue Diamond Corp.

166 Tons, Los Angeles, Earle M. Jorgensen office building, to Bethlehem Pacific Coast Steel Corp.

137 Tons, San Juan Creek, Cal., San Juan Creek bridge, to Soule Steel Co.

135 Tons, Los Angeles, Van's market building, to Blue Diamond Corp.

• • • **Sheet piling awards** this week included the following:

1200 Tons, State of Maine, state highway project to American Bridge Co., Pittsburgh.

• • • **Sheet piling inquiries** this week included the following:

1940 Tons, Long Beach, Cal., bulkheads at berths 52, 53 and 54, Long Beach Inner Harbor, Port Manager, Long Beach, Spec. HD-221, bids open Aug. 20.

Tinplate Limitations Expected to Be Eased Or Revoked on Sept. 30

Washington

• • • **Indications point** to the easing, if not revocation, on Sept. 30, of Direction 9 to M-21 under which 85 pct of the tin mill products are channeled into the production of cans and closures for perishable foods, pharmaceuticals, and other so-called "end" cans.

This was indicated Aug. 8 when the tinplate industry advisory committee met with CPA officials. Members of the committee unanimously agreed that the order should not be continued in its present form during the fourth quarter, and Charles Halcomb, government presiding officer, in speaking of the improved supply, said that the existing restrictive channeling of tin mill products may not be required during the last quarter. He stated that the seasonal requirements for food canning will diminish after September.

Mr. Halcomb declared that hundreds of industries, including those of such importance as dairy ware, chicken brooders, and sprayers, have undergone hardships in attempting to maintain production on their slim share of 15 pct of the output of tin mill products, available to them under Direction 9.

In the fourth quarter requirements for certified orders there is a carryover of 80,000 tons for food cans and the farm relief program. Some of this expected carryover, manufacturers pointed out, is not the result of lack of production in the third quarter, but results from the inability to obtain packaging material for delivery within the quarter.

P. J. Treacy, chief of CPA's steel branch, informed the committee that its view would be taken under consideration and the decision reached when more information including a definite figure on fourth quarter export requirements is available.

•

• • • **CPA has fixed** fouth quarter export allocations of tinplate at 136,000 tons, exceeding by 24,000 the third quarter quota for shipment abroad. CPA said that the last quarter allocations will be used entirely for preservation of food in or for famine stricken countries and will take some of the pressure off of American food production.

Increases in the fourth quarter were granted largely to areas below the Equator, notably Australia, New Zealand, South Africa and South America, where heaviest food pack comes in the fourth quarter and the first quarter of next year. CPA officials pointed out that of the total allocation, 94,250 tons were going to these four areas.

Pig Iron Price Relief For Special Cases Only

Washington

• • • **OPA's refusal** to grant a further pig iron price increase is taken here to indicate an intensified move for subsidies for marginal furnaces from RFC and NHA and also individual "hardships" applications to OPA for increased prices.

In declaring that no further increases in maximum prices for pig iron is planned for the near future, OPA Administrator Paul Porter told THE IRON AGE he was making the statement in order to clear up the situation and to "prevent sales from being delayed as a result of the circulation of rumors in the industry that a price increase is imminent."

"Pig iron prices were raised $2 a gross ton on July 27," Porter said, "to cover cost increases incurred by pig iron producers since March 15, 1946 when the price was raised 75¢ per gross ton.

"The $2 increase was designed to enable producers to offset their increased costs and meet OPA earning standards. Our data shows that these increases accomplished this and that a further increase is not justified."

MACHINE TOOLS

. . . News and Market Activities

WAA Has $860 Million in Machinery

• • • **According to** the War Assets Administration's quarterly progress report to Congress, for the second quarter of 1946, the inventory of metalworking machinery and equipment, including machine tools, presses, bending and forming machines and other metalworking equipment as well as abrasives and cutting tools amounted to $860,000,000 at the end of May, after cumulative sales of $267,000,000 in terms of the original cost.

WAA's report states that in addition to the confirmed inventory, there is a substantial but unknown quantity of metalworking machinery and equipment in warehouses located in various parts of the country which has not been included in WAA inventories because the Defense Plant Corp., the major owning agency, found it necessary to clear contractors' plant of government-owned equipment prior to the submission of declarations to WAA.

Machine tools, according to the report, are the major component of the metalworking and equipment class, accounting for almost 80 pct of the total confirmed inventory at the end of May. Information available indicates that the same ratio probably exists in the case of the unconfirmed inventories, the report states, concluding that the disposal problem in metalworking machinery is therefore largely a machine tool problem, a fact which does not come as news to most machine tool builders.

The tabulation below, included in the report, indicates the second quarter position of machine tools as compared with the first quarter, in thousands of dollars.

The number of machine tools in inventory, according to WAA, rose from 117,663 at the end of March to 156,849 at the end of May. Acquisitons reached an alltime high of 44,715 units in April. Disposals also rose to a new peak of 12,190 machines in April, but dropped to 9535 machines in May. Sales in May, the report states, were 23 pct greater than the average monthly sales during the first quarter of the year.

Summing up the "approved dealer" plan, the WAA report states that by the end of the second quarter 2512 distributors of machine tools are under contract to sell surplus machine tools as "approved dealers." Cumulative sales by these dealers through June 15 amounted to $77,000,000 (reported cost).

June activities under these contracts were interrupted by a ruling of the Controller General that dealer contracts executed after Mar. 25, when WAA came into existence and no longer operated as a government corporation but as an administrative agency, were invalid.

"These dealers have proved very effective, having disposed of more than one-half of the tools that were sold in May. Under new legislation, it is expected that the dealer program will be permitted to continue as originally set up."

WAA's report concludes, that "with acquisitions continuing to accelerate at a higher rate than sales, WAA has recognized the need for perfecting an aggressive sales program for machine tools. During the second quarter, and the review of machine tools sales programs was begun with a view toward increasing sales. Among the plans being considered are: an improved export program, sales to vocational and technical schools at nominal price, and a trade-in program."

Item	First Quarter 1946	Second Quarter 1946 (estimated)	Per cent Difference
Beginning inventory	296,993	549,014	+84
Net acquisitions (during quarter)	332,242	321,000	− 3
Total disposal (during quarter)	80,220	81,000	+ 1
Sales (reported cost) (during quarter)	79,613	80,000	(1)
Sales (sold for) (during quarter)	38,068	37,000	− 2
Ending inventory	549,015	789,015	+44
Cumulative acquisitions (end)	700,307	1,021,307	+46
Cumulative disposals (end)	151,292	232,292	+54

(1) Less than 0.5 pct.

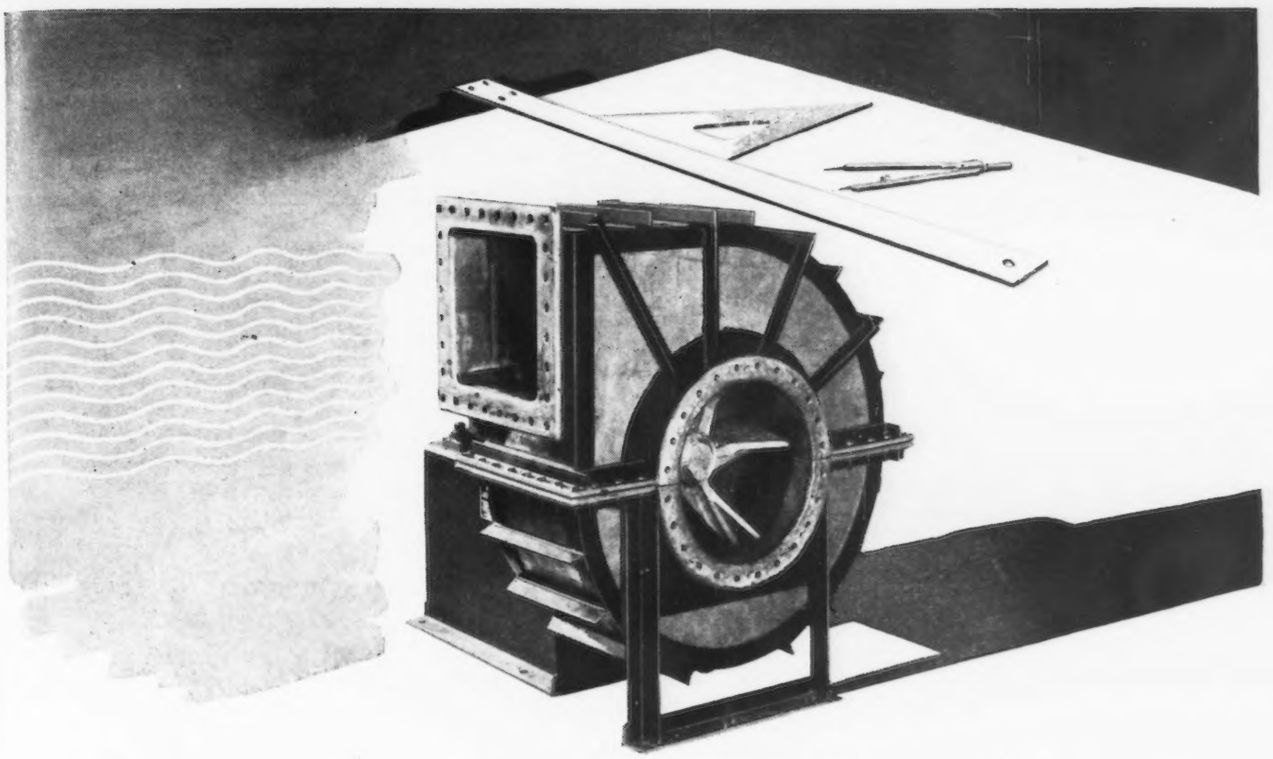
In Cincinnati labor strife appears to be at an end for the time being at least. Although a number of personnel executives indicate there is still a shortage of skilled men, labor forces are generally in good shape. Apprentice-training schools are once more under way, so that the supply of able workers will be improved.

In Boston and the East, sales are running true to form, with domestic ordering on a limited scale, with operations' men waging a fight against the holders of the purse strings, for the new equipment instead of the government-owned surplus. Some sources allege that this is also a firm indication that the surplus has been pretty well picked over. Good small milling machines are hard to locate, and the same is reported true of numerous other items in the surplus. Export business, however, dominates the trade talk.

Builders of specialized machine tools in the Detroit area are reported to be overloaded with quotations for highly specialized equipment of all kinds and there is no indication that demand is leveling off. Most standard machines are in light demand which is being satisfied for the most part by sales from WAA surplus. A fairly brisk business in standard equipment involving foreign buyers is reported.

Meanwhile, the backlog of orders for resistance welding equipment is reported to be the highest in history.

A sharp demand for materials handling equipment is also felt. Retooling programs for 1947 cars have slowed up noticeably.



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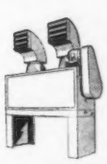
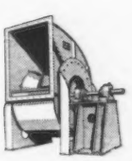
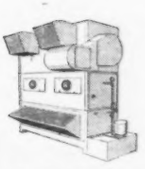
4 YEARS OF WAR-STIMULATED IMPROVEMENT—ON TOP OF 61 YEARS OF ENGINEERING DEVELOPMENT

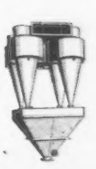

Heating Equipment

Ventilating Equipment

Gyrol Fluid Drive


Industrial Fans


Air Conditioners


Dust Collectors

NONFERROUS METALS

. . . News and Market Activities

Metals Reserve May Release More Copper

New York

• • • **At the ceiling** price of 14.375¢ per lb, most producers are selling only metal, which is subject to premium payments. An additional allocation of Metals Reserve copper for August is understood to be in process, but there is no information at this time on additional tonnages available. A purchase of 40,000 tons of Chilean copper is reported to have been concluded at a price of 15.75¢, although there is the possibility of a strike of miners in Chile which would reduce the beneficial results of the contract.

There is evidence that the OPA is acting to readjust ceiling prices on brass and bronze ingots. This action is made necessary by the unwillingness of ingot producers to make sales at current ceilings in view of the acquisition of copper and zinc scrap on a free market basis.

United Kingdom exports are reported to be under rigid control in view of the underestimation of the tonnages necessary for reconstruction and reconversion purposes. The Rhodesian copper strike is said to have been concluded as of Aug. 15.

•

Lead

• • • **Lead supplies** continue limited by the effect of the rolled back ceiling of 8.25¢ at New York. Converters and remelters are unwilling to market metal at this price, which was bought in on the basis of the former 9.50¢ market. Latest information from the trade is that there has been no response from OPA on the advisory committee consituted some ten days ago. Meanwhile most producers are only selling metal on which premium payments are payable, as it is claimed that lead cannot be sold at a profit at the current ceiling.

It is reported that RFC is tendering contracts for the purchase of some 25,000 tons of lead from Latin America at a price of 9.50¢ per lb. Most of these producers are said to be ready to accept this price, although a few have been holding out for 10.00¢.

United Kingdom exports of lead are reported to have been placed under rigid control by the government. U. K. imports of lead in June are reported to be nearly 18,000 tons, which represents a 100 pct increase over May. Australia shipped 8677 tons, Canada 3500, Mexico 1982.

•

Premiums to Continue

Washington

• • • **Subsidy payments** on imports of nonferrous metal ores and concentrates will be continued on the same basis that prevailed on June 29. In letters to OPA, CPA and RFC, Reconversion Director John R. Steelman said that he had authorized RFC to undertake the necessary action under the foreign metal purchase program which was authorized by the Price Control Extension Act of 1946.

•

Platinum

• • • **Wall Street** took the lead in forcing the price of platinum from $70.00 to $83.00 an ounce. Market operators have been offering to pay $75.00 abroad when the price here was stabilized at $70.00. Now it is understood that at the current price of $83.00, operators are offering $90.00 abroad. These activities are believed to be stimulated by the government's intention to triple the strategic stockpile of platinum. However, it is true that there is a world shortage of the metal, with producers' current output only sufficient for half the present requirements. Expansion of production facilities is not easily accomplished.

•

Aluminum Wire Prices Up

Washington

• • • **Effective Aug. 12,** OPA increased prices of aluminum steel reinforced transmission line cable, 12 pct, weather proof aluminum wire, 17.5 pct, and insulated aluminum wire and cable, 18 pct. Resellers were authorized to raise their ceiling prices by the same percentage.

•

UK Copper Imports Up

London

• • • **Copper consumption** in the United Kingdom rose to nearly 44,800 tons in June, while imports totaled 35,800 tons. Imports for the first six months of 1946 amounted to 129,900 tons, of which Rhodesia provided 14,568 tons of electrolytic and 57,983 tons of blister copper. During the first half of last year, imports amounted to 145,600 tons. With the reopening of the Continent, imports of blister copper from the Belgian Congo have almost ceased and smaller quantities of electrolytic are being drawn from this source. So far, not much of the Chilean copper purchased has arrived.

•

End Light Alloy Controls

London

• • • **The British Government** wartime control of aluminum and light alloys ended as of the beginning of August. The government will continue to be the sole buyer and seller of virgin aluminum, and its main source of supply will come from Canada, from whom it has purchased 236,500 tons for delivery in 1946 and 1947.

Nonferrous Metals Prices

Cents per pound

	Aug. 7	Aug. 8	Aug. 9	Aug. 10	Aug. 12	Aug. 13
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Tin, Straits, New York	52.00	52.00	52.00	....	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	8.10	8.10	8.10

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$30.00
Cadmium, del'd	$1.25
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake, Conn. Valley	14.375
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$99 to $100
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$83.00
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.69
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	12.00 to 12.50
Aluminum, deoxidizing	
No. 2	12.50
No. 3	11.50
No. 4	10.75
Brass Ingot—ceiling prices	
85-5-5-5 (No. 115)	15.50
88-10-2 (No. 215)	18.75
80-10-10 (No. 305)	18.25
No. 1 Yellow (No. 405)	12.50

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	....	25.81
Copper, H.R.	....	22.16	....
Copper drawn	....	23.16	....
Low brass, 80%	....	24.35	24.66
High brass	....	....	24.38
Red brass, 85%	....	24.67	24.98
Naval brass	23.84	22.59	28.53
Brass, free cut	....	18.53	....
Commercial, bronze	....	25.50	25.81
Manganese bronze	27.45	25.95	32.03
Phosphor bronze, A, B, 5%	....	43.68	43.43
Muntz metal	23.59	22.34	26.78
Everdur, Herculoy, Olympic or equal	....	29.32	30.88
Nickel silver, 5%	....	34.44	32.38
Architectural bronze	22.50	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢, 52S-O, 67¢ 24S-T, 71¢: base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢ 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

(Continued, See Next Column)

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable	....*
Lead covered telephone, power cable	....*
Insulated copper	....*

OPA Group 2†

Bell metal	17.25
High grade bronze gears	15.00
High grade bronze solids	....*
Low lead bronze borings	....*
Babbitt lined brass bushings	14.75
High lead bronze solids	....*
High lead bronze borings	....*
Red trolley wheels	12.50
Tinny (phosphor bronze) borings	12.25
Tinny (phosphor bronze) solids	12.25
Copper-nickel solids and borings	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition)	10.75
Soft red brass borings (No. 1)	10.75*
Gilding metal turnings	10.25
Contaminated gilded metal solids	10.25
Unlined standard red car boxes	10.00
Lined standard red car boxes	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3†

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors	7.75
Manganese bronze solids	8.00[1]
Manganese bronze solids	7.00[2]
Manganese bronze borings	7.25

OPA Group 4†

Refinery brass	6.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap†

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose	9.625
Loose yellow brass trimmings	9.625

Aluminum

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.25
turnings, dry basis	1.50 to 1.75
Low copper, alloys 51, 52, 61, 63S solids	8.00 to 8.50
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	4.25 to 4.50
Turnings, dry basis	1.50 to 1.75

Obsolete scrap

Pure cable	6.50 to 7.50
Old sheet and utensils	5.00 to 5.50
Old castings and forgings	5.00 to 5.50
Pistons, free of struts	4.00 to 4.50
Pistons, with struts	2.50 to 3.00
Old alloy sheet	2.00 to 2.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	7.50
Engravers, lithographers plates	7.50
Old zinc scrap	5.75
Unsweated zinc dross	6.00
Die cast slab	5.50
New die cast scrap	5.45
Radiator grilles, old and new	4.50
Old die cast scrap	4.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.

Soft lead scrap	7.50

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight	23.97
Curved, 18 in. or longer	23.97
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	27.25
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80¾

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.655
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

. . . News and Market Activities

Mills Bite Into Stocks as Shipments Lag

New York

• • • **It is clear,** from reports in scrap markets throughout the nation, that dealers are holding back iron and steel scrap in anticipation of OPA price action in the near future. While stocks held back are not large in individual cases, observers believe that their release would materially ease the present situation. There are further signs this week that production scrap lists are continuing to improve, but mills are still dipping into inventories to maintain their present record output. Shipments approximate 40 to 50 pct of mill requirements.

A report from Chicago that one large producer has stopped cutting into inventory is one of the few bright spots in a picture in which demand continues to outstrip shipments.

St. Louis reported the first signs that the Granite City Steel strike was settled as the company had ceased unloading scrap in railroad yards and was keeping it in cars ready to move into the plant.

It is understood that the Institute of Scrap Iron & Steel has not yet had an opportunity to present to OPA its plea for a $3.50 a ton increase across-the-board plus $1.50 more on preparation charges.

•

PITTSBURGH—Scrap continues very scarce in the district, but no steel producers are known to have curtailed steelmaking as a result of the shortage. Actually, however, this curtailment is probably being offset by consumption of scrap stocks, a situation that has been taking place at a rate far greater than incoming shipments. Cast scrap is non-existent. Carloads of cast never accumulate because as soon as a truck load is acquired consumers are clamoring for it.

•

CHICAGO—Only small quantities of scrap continue to be shipped though dealers and brokers report larger tonnages being held back. Some direct shipments from fabricators to mills are reported. Cast iron scrap has dried up considerably in the past week. One large producer is receiving better deliveries and has stopped dipping into inventory. Others report the situation still acute with smelting schedules subject to almost a day to day change. Some of those in the scrap industry are looking to other fields of endeavor where profit may still exist.

•

PHILADELPHIA—Scrap is not moving here except for an occasional car which requires no preparation. Mills are reported to have sales personnel out scouting for scrap, and reciprocity deals with steel consumers are stimulating long distance cross-hauling. A survey of yard supplies indicates that tonnages there are surprisingly low. Mills are reported to be not examining carefully for alloy scrap although they will not accept it as such. However offerings can be obtained for the SAE 4300 grades. Reports are rife of cast scrap sales at $30 delivered.

•

DETROIT—Events of the past week have served to thoroughly confuse both scrap buyers and sellers in the Detroit area. Some buyers have been offered scrap during the past week by sources that have been out of the market for some time. OPA inspectors visited the city this past week, apparently for the purpose of checking alleged upgrading and it is reported that 25 cars were rejected at one mill and 20 at another location as being improperly classified. This has had an additional effect of making buyers and sellers cautious at a time when the resources of the country are being combed for additional scrap.

•

BOSTON—Local brokers and yards are doing little to relieve the shortage of scrap at steel mills. Brokers maintain all grades are hard to pick up, and yards that they intend to hold what little material they can muster for higher returns. The latter feel that sooner or later mills will accept anything, classification notwithstanding. Regardless of talk, scarcity of scrap is the big factor.

•

NEW YORK—There is considerable evidence here that yards are withholding a fair quantity of scrap. The volume involved in any specific case is not large compared to melters' needs but the overall amount is believed to be substantial. Flow to steel mills is in the neighborhood of 40 to 50 pct of their current requirements, while the cast grades are reported to be exceedingly difficult to pick up in any quantity.

•

BUFFALO—Scrap shows no signs of loosening up and curtailment of operations has been averted only by heavy use of raw materials. Melters who ordinarily demand premium grades have been buying lighter stuff to fill the gap. Although OPA inspectors have been reported scrutinizing receipts elsewhere for evidence of upgrading no undue activity of this nature has been noted here. Dealers and consumers generally expressed the opinion that few evasions of price regulations would be found in any such event. One however predicted that any unusual interest by OPA in local shipments would serve to halt the meager flow. Valley mills have been shopping for scrap in this market apparently without success. While it is doubted that a $3.50 lift across the board would materially increase the volume of scrap movement the trade feels an advance would settle the question of how much tonnage had been held back for higher prices.

•

ST. LOUIS—With the hope of obtaining price relief shippers of scrap iron continue to hold on to their supplies, as they have been doing ever since the OPA was restored and movement to the St. Louis industrial district has been almost nothing. The mills in the district are in good shape, better it is said, than elsewhere. The outlook for an early settlement of the strike at the Granite City Steel Co. appears good and the company has stopped unloading scrap in railroad yards so that the cars may be moved quickly to the plant. The only sizable railroad list pending is Louisville & Nashville, 4800 tons.

•

CLEVELAND—While most dealers' yards here are practically empty, the possibility of a scrap price increase is keeping some tonnage off the market. Shipments to mills and other consumers are down at least 50 pct, with one major consumer in the Youngstown district reporting only 140 tons on hand as of the first of the week and no relief in sight. Because of OPA's renewed vigilance, overgrading has fallen off considerably.

•

BIRMINGHAM—Scrap is tighter than ever here. Although brokers continue to offer ceiling prices they are buying practically no scrap. Trade sources see no immediate prospects for improvement and predict it will tell on steel production in another week or so.

•

CINCINNATI—Pressure for deliveries by mills and foundries continues to be strong with the available supply still sharply restricted. Many foundries are still on a hand to mouth basis and mills are dipping into inventories to sustain production.

•

TORONTO—Dealers here report that offerings are low though they are able to build up some stocks because mills scrap receipts are still cut off due to the strike. Cast grades remain in heavy demand with supply limited. Transportation limitation and production cutbacks are cutting further into scrap volume which should be building up against winter needs.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used they indicate the OPA ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
Nos. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*
Machinery cast	20.00*
Breakable cast.	16.50*
Stove plate	19.00*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast.	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	21.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast.	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$18.00*
No. 1 hvy. melting	17.00*
No. 2 hvy. melting	17.00*
No. 2 bales	$15.00 to 15.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00
No. 2 hvy. melting	17.00
No. 1 bales	$16.00 to 17.00
No. 2 bales	15.50 to 16.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	7.00
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	18.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Aug. 13, 1946	Aug. 6, 1946	July 9, 1946	Aug. 14, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.00	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.55	4.55	4.55	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00
Light rails	49.18	49.18	49.18	45.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*: (per gross ton)	Aug. 13, 1946	Aug. 6, 1946	July 9, 1946	Aug. 14, 1945
No. 2 foundry, Phila.	$30.43	$30.43	$30.34	$26.84
No. 2, Valley furnace	28.50	28.50	28.50	25.00
No. 2, Southern, Cin'ti	27.80	27.80	28.94	25.44
No. 2, Birmingham	24.88	24.88	24.88	21.38
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.00
Basic, del'd eastern Pa.	29.93	29.93	29.84	26.34
Basic, Valley furnace	28.00	28.00	28.00	24.50
Malleable, Chicago†	28.50	28.50	28.50	25.00
Malleable, Valley	28.50	28.50	28.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.

‡ For carlots at seaboard.

* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	9.85	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	14.375	14.375	14.375	12.00
Copper, Lake, Conn.	14.375	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	9.50	8.25
Lead, St. Louis	8.10	8.10	9.50	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Aug. 13, 1946	2.72115¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One week ago	2.72115¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One month ago	2.72115¢ per lb.	$28.12 per gross ton	$19.17 per gross ton
One year ago	2.44076¢ per lb.	$24.61 per gross ton	$19.17 per gross ton

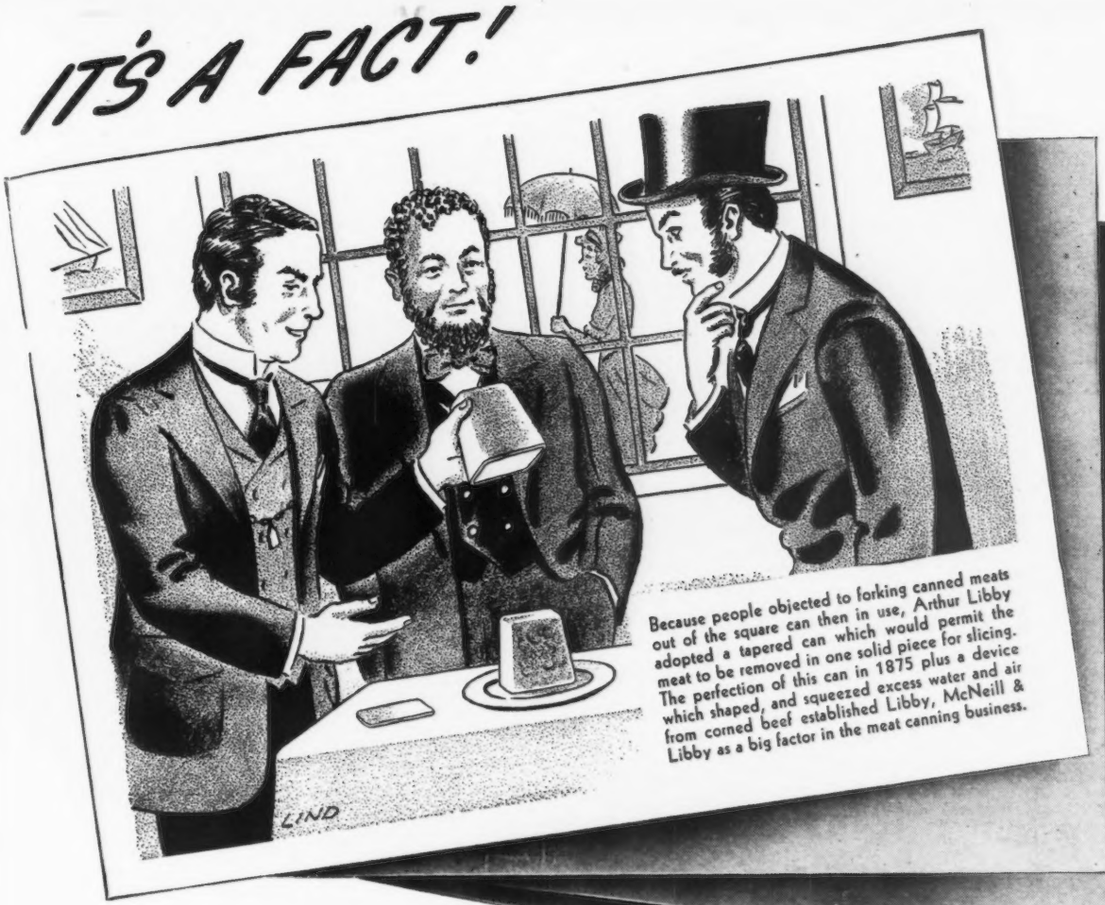
	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.72115¢ Apr. 2	2.54490¢ Jan. 1	$28.13 May 29	$25.37 Jan. 1	$19.17	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

IT'S A FACT!



Because people objected to forking canned meats out of the square can then in use, Arthur Libby adopted a tapered can which would permit the meat to be removed in one solid piece for slicing. The perfection of this can in 1875 plus a device which shaped, and squeezed excess water and air from corned beef established Libby, McNeill & Libby as a big factor in the meat canning business.

It's a better known fact

THAT J&L TIN MILL PRODUCTS HAVE THE QUALITIES THAT GIVE LONG SERVICE

The controlled temper and uniform gage of J&L Tin Mill Products make it possible for them to go through your shaping and forming operations with best results. Their superior surface improves the attractiveness of any product and provides excellent adhesion for lacquers, porcelain enamel and plastic coatings as well as lithographed and painted designs.

J&L Hot Dipped and Electrolytic tin plate and terne plate have the evenly distributed coatings necessary to make soldering operations go smoothly and to provide full protection for the desired service life.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points→	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$48.69	$48.69				$48.69	(Bethlehem, Massillon, Canton, Coatesville=$43.69)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	$39	$39	$39	$39	$39	(Provo=$50.20, Duluth=$41[14]) $39	$39	$39				$51[14]	$41		
Carbon, forging billets	$47	$47	$47	$47	$47	(Provo=$59.20, Duluth=$49[14]) $47	$47					$59[14]	$49		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$61.43		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15] No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢		(Worcester=2.40¢)				2.55¢	2.80¢			
SHEETS Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.685¢	2.615¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.85¢	3.30¢	3.60¢	3.56¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.80¢		4.45¢	4.41¢
STRIP Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.85¢	2.81¢
Hot-rolled [3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.75¢	2.71¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.375	$5.301
Electro, box 0.25 lb	$4.35	$4.35	$4.35					$4.35							
Electro, box 0.50 lb	$4.50	$4.50	$4.50					$4.60	$4.60						
Electro, box 0.75 lb	$4.65		$4.65					$4.75	$4.75						
BLACKPLATE 29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.66¢	3.59¢
TERNES, MFG. Special coated, base box	$4.55	$4.55	$4.55					$4.65	$4.65						
BARS Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Duluth=2.60¢) (Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.86¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.61¢	2.69¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem, Massillon, Canton=2.92¢)					3.02¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.73¢		
PLATE Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢) 2.50¢			2.85¢	3.05¢	2.72¢	2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.27¢	4.49¢		4.01¢	3.895¢
SHAPES Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.54¢	2.43¢
SPRING STEEL, C-R 0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester=3.20¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9] Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)					3.55¢		3.44¢	3.41¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢)			(Trenton=4.25¢)		4.50¢		4.39¢	4.339¢
PILING Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢		2.99¢	3.01¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Newark, N. J., Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.75	$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50c a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70†	3.70	3.733†‡	.....
Cold-rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.66†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$32.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging grade, heat treated.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
½-in.	60½	48
¾-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

½-in.	17⅞	+4⅜
¾-in.	24¼	2⅝
1-in. and 1¼-in.	28⅝	9⅛
1½-in.	33	11⅞
2-in.	32⅜	11⅝

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅝
4½-in. to 8-in.	27	10¼

Steel (butt, extra strong, plain ends)

½-in.	58½	47½
¾-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

½-in.	18⅞	+1⅝
¾-in.	25⅜	4¾
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28⅛	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅜	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft to 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in., del'd Chicago.....$70.33
6-in. to 24-in., del'd New York.... 69.60
6-in. to 24-in., Birmingham..... 61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less 84.40

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter...65½
9/16 & ⅝ in. x 6 in. & shorter.....63½
¾ to 1 in. x 6 in. & shorter.....61
1⅛ in. and larger, all lengths.....59
All diameters over 6 in. long.....59
Lag, all sizes 62
Plow bolts 65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger 56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

Consumer

Packages, nuts loose .....71 and 10
In packages 71
In bulk 80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $4.75
F.o.b. Lebanon, Pa. 4.90

Small Rivets
(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws

Percent Off List Consumer

Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. 64
Upset set screws, cup and oval points 71
Milled studs 46
Flat head cap screws, listed sizes..... 36
Fillister head cap, listed sizes..... 51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer $5.45
Old range, non-bessemer 5.30
Mesaba, bessemer 5.20
Mesaba, non-bessemer 5.05
High phosphorus 5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh..19¼¢ to 21½¢
Copper, electrolytic, 100 and 375 mesh .....23½¢ to 27½¢
Copper, reduced, 150 and 200 mesh ..... 22⅜¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.....11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. New York, carlots ..... 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots ..... 63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe ..... 17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe .....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots 25¢
Antimony, 100 mesh ..... 30¢
Cadmium, 100 mesh $1.75
Chromium, 100 mesh and finer..... $1.25
Lead, 100, 200 & 300 mesh.13¼¢ to 16¾¢
Manganese, minus 325 mesh and coarser ..... 44¢ to 61¢
Nickel, 150 mesh ..... 51½¢
Silicon, minus 325 mesh and coarser ..... 26¢ to 55¢
Solder powder, 100 mesh..8½¢ plus metal
Tin, 100 mesh ..... 58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb $2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.. $2.65
Under 100 lb..... $2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50
Connellsville, Pa., hand drawn.	8.00
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis.....$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio 60.40
First quality, New Jersey 65.90
Sec. quality, Pa., Md., Ky., Mo., Ill. 54.80
Sec. quality, New Jersey 57.70
Sec. quality, Ohio 52.95
Ground fire clay, net ton, bulk.... 8.95

Silica Brick

Pennsylvania and Birmingham....$60.40
Chicago District 69.30
Silica cement, net ton (Eastern)... 10.60

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester $54.00

Magnesite Brick

Standard, Balt. and Chester $76.00
Chemically bonded, Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks $44.50
Domestic, f.o.b. Chewelah, Wash., in bulk 22.00
in sacks 26.00
Clinker (dead burned) dolomite, per ton East, $9.30; Midwest, add 10¢; Mo. Valley, add 20¢.

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.743	$5.097	$5.218a	$4.272	$4.172	$5.022	$3.855	$3.916	$4.072	$4.522	$6.016	$7.116	$7.372	$8.422
New York	3.815	4.838[1]	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston	3.999	4.969[3]	5.674	4.458	4.358	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore	3.619	5.077	5.344	4.252	4.152	....	3.844	4.009	4.052	4.502	6.109	7.209	7.352	8.402
Norfolk	3.996	....	5.821	4.515	4.415	....	4.221	4.252	4.315	4.615	....	....	....	....
Chicago	3.475	4.425	5.581	3.95	3.85	4.90[6]	3.80	3.80	3.75	4.20	5.80	6.90	....	8.00
Milwaukee	3.612	4.562[1]	5.537	4.087	4.077	5.037[6]	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland	3.575	4.625	5.327	3.95	3.85	4.70[6]	3.65	3.838	3.60	4.20	6.006	7.106	6.95	8.00
Buffalo	3.575	4.625	5.20	4.169	4.069	4.919[6]	3.88	3.65	3.60	4.20	5.80	6.90	6.95	8.00
Detroit	3.675	4.725	5.45	4.05	3.95	....	3.859	3.911	3.70	4.25	6.13	7.23	7.55	8.65
Cincinnati	3.65	4.70[1]	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	7.25	7.311	8.65
St. Louis	3.622	4.572[1]	5.581	4.097	3.997	5.181[6]	3.947	3.947	3.897	4.481	6.181	....	7.331	....
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	5.80	6.90	6.95	7.95
St. Paul	3.797	4.747	5.635	4.272	4.172	5.352	4.122	4.122	4.072	4.811	6.202	6.302	7.352	7.402
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	....	7.28	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.903	....	....	....	....
Memphis	4.19	4.885	5.715	4.565	4.465	....	4.315	4.315	4.265	4.78	....	....	....	....
New Orleans	4.283*	5.304	5.808	4.658	4.558	....	4.408	4.408*	4.358*	5.079	....	....	....	....
Houston	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Los Angeles	4.85	6.60[1]	6.55	5.30	5.20	....	4.80	4.70	4.65	6.03	....	....	....	....
San Francisco	4.12	6.87	6.35	4.60	4.50	4.15	4.15	4.15	4.30	5.78	....	....	....	....
Seattle	4.87[5]	7.27[2]	6.40	4.60	4.50	....	5.00[5]	4.70[5]	4.60[5]	6.23	....	....	....	....
Portland	4.87[4]	6.82[2]	6.20	5.10	5.00	....	5.00[4]	4.70[4]	4.70[4]	5.98	8.15	....	9.20	....
Salt Lake City	4.75	....	6.62[7]	5.88	5.78	....	5.23[7]	5.23[7]	5.13	6.35	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	29.00	29.50	30.00	30.50	....
Birdsboro	29.00	29.50	30.00	30.50	34.00
Birmingham	23.50*	24.88*	....	29.50	....
Buffalo	27.50	28.50	29.00	29.50	34.00
Chicago	28.00	28.50	28.50	29.00	....
Cleveland	28.00	28.50	28.50	29.00	....
Detroit	28.00	28.50	28.50	29.00	....
Duluth	28.50	29.00	29.00	29.50	....
Erie	28.00	28.50	29.00	29.50	....
Everett	29.00	29.50	30.00	30.50	....
Granite City	28.00	28.50	28.50	29.00	....
Hamilton	28.00	28.50	28.50	....	....
Neville Island	28.00	28.50	28.50	29.00	....
Provo	26.00	26.50	....	....	....
Sharpsville	28.00	28.50	28.50	29.00	....
Sparrows Point	29.00	29.50	....	....	....
Steelton	29.00	....	....	....	34.00
Swedeland	29.00	29.50	30.00	30.50	....
Toledo	28.00	28.50	28.50	29.00	....
Youngstown[1]	28.00	28.50	28.50	29.00	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	....
Boston	Birdsboro-Steelton	4.47	....	....	....	....	38.47
Brooklyn	Bethlehem	2.78	31.78	32.28	32.78	33.28	....
Brooklyn	Birdsboro	3.26	....	....	....	....	37.26
Canton	Clev. Ygstn, Sharpsvil.	1.54	29.54	30.04	30.04	30.54	....
Canton	Buffalo	3.55	....	....	....	....	37.55
Cincinnati	Birmingham	4.30	27.80*	29.18*	....	....	....
Cincinnati	Hamilton	1.24	....	....	29.74	....	....
Cincinnati	Buffalo	4.89	....	....	....	....	38.89
Jersey City	Bethlehem	1.70	30.70	31.20	31.70	32.20	....
Jersey City	Birdsboro	2.16	....	....	....	....	38.16
Los Angeles	Provo	5.25	31.25	31.75	....	....	....
Los Angeles	Buffalo	16.33	....	....	....	....	50.33
Mansfield	Cleveland-Toledo	2.16	30.16	30.66	30.66	31.16	....
Mansfield	Buffalo	3.74	....	....	....	....	37.74
Philadelphia	Swedeland	0.93	29.93	30.43	30.93	31.43	....
Philadelphia	Birdsboro	1.38	....	....	....	....	35.38
San Francisco	Provo	5.25	31.25	31.75	....	....	....
San Francisco	Buffalo	16.33	....	....	....	....	50.33
Seattle	Provo	5.25	31.25	31.75	....	....	....
Seattle	Buffalo	16.33	....	....	....	....	50.33
St. Louis	Granite City	0.50 Arb.	28.50	29.00	29.00	29.50	....
St. Louis	Buffalo	7.86	....	....	....	....	41.86

* Republic Steel Corp. has been granted a $2 increase on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn, and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace. Delivered to Chicago, $42.34.

High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$34.00; f.o.b. Buffalo—$35.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05	6.30	6.60
Ton lots	6.65	7.55	8.55
Less ton lots	6.80	7.80	8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $51.25 f.o.b. Keokuk, Iowa; $48.00 f.o.b. Jackson, Ohio; $49.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10	13.55	16.50
97% Si, 1% Fe	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.05	4.55	4.60
Less ton lots	4.45	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.38
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

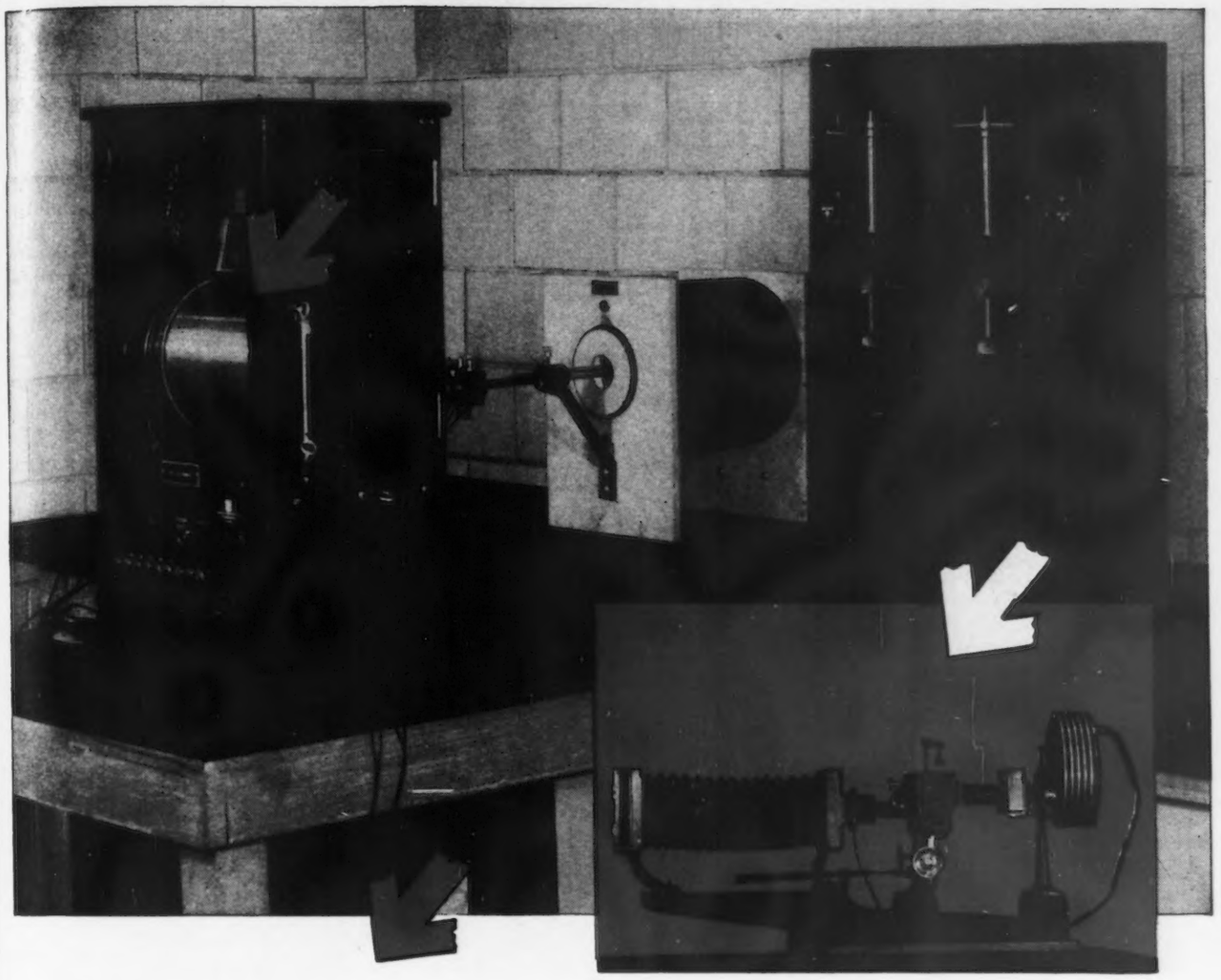
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢



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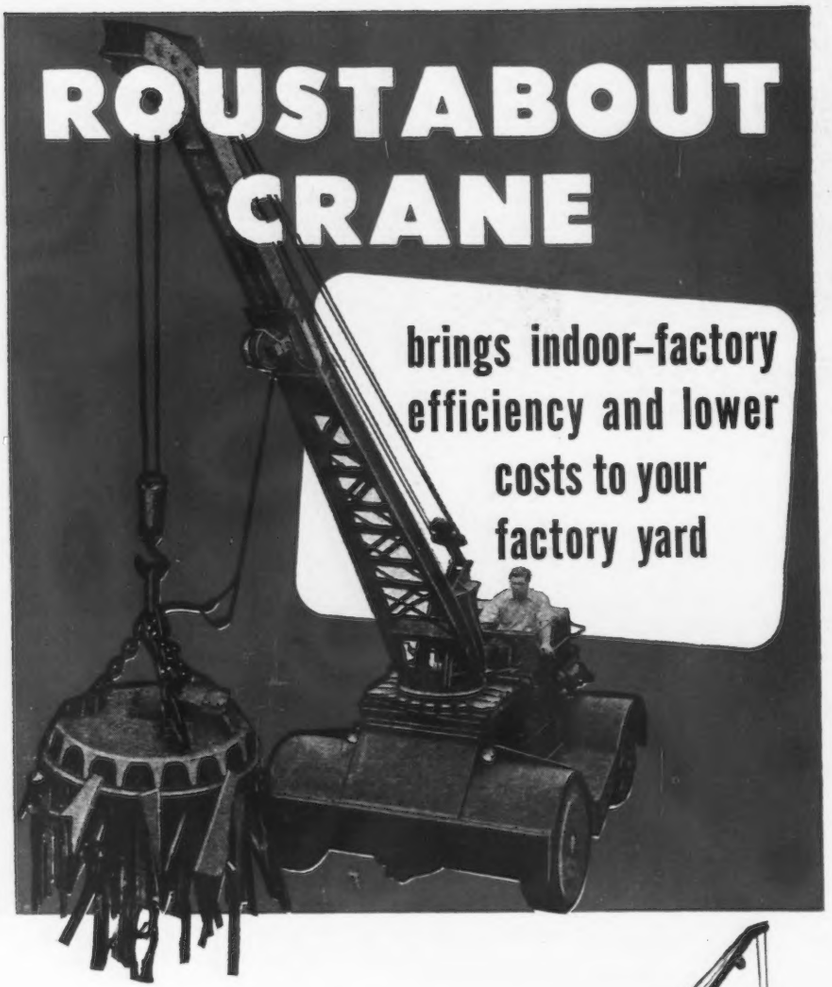

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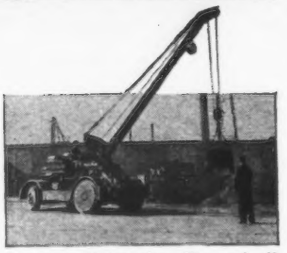

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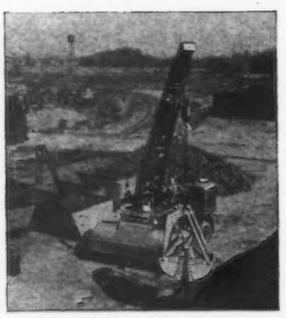

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British Nations Hold Auto Golden Jubilee

Detroit

• • • **Money is not** the only thing Britain is borrowing from the United States. The British Commonwealth has also borrowed the motor car industry's Golden Jubilee idea and an elaborate celebration extending from July 18 to Nov. 20 is being held in the British Commonwealth of Nations.

It is significant that the British celebration carries the slogan, "Vital to the Life of the Nation," and emphasizes the fact that the recent war has proved the absolute necessity of a nation being "knowledgeable" in the trade of motor mechanics if it hopes to survive.

The British point to the fact that they are grateful for having had an efficient and immense motor industry to turn to when the call came for arms and equipment to wage mechanized war. The youth of Britain, it is said, must be encouraged to become motor-minded and this encouragement will be provided in the National model competition which is being organized as part of the Jubilee celebration.

Pig, Scrap Shortages Cut Foundry Output

Washington

• • • **Production** of foundry and malleable iron during the first half of 1946 amounted to 360,000 net tons per month as compared with 386,000 tons per month for the same period in 1945, CPA has advised the Malleable Iron Industry Advisory Committee.

CPA officials said the drop in production resulted from the shortage of pig iron and scrap. The high point in 1946 production was reached in March with 436,000 tons and the low in May with 268,000.

Committee members recommended that foundry pig iron controls be dropped as of Sept. 30, as it was expected that the shortage would be over by that date.

In addition, the committee recommended that CPA issue a limitation order restricting uses of soil pipe in order to prevent its utilization for carrying away rainwater and other purposes for

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STANDARD STRUCTURAL ALLOY STEELS
MAGNAFLUX-AIRCRAFT QUALITY STEELS
BEARING QUALITY STEELS • ALLOY TOOL STEELS
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which a less critical product could be substituted.

Industry requirements for foundry nails and core wire can be met from current production, CPA told committee members.

First meeting of the committee under the sponsorship of CPA was held on July 25. Members of the committee are:

C. S. Anderson, Belle City Malleable Iron Co., Racine, Wis.; L. A. Dibble, Eastern Malleable Iron Co., Naugatuck, Conn.; Charles A. Gutenkunst, Jr., Milwaukee Malleable & Grey Iron Works, Milwaukee; Anthony Haswell, Dayton Malleable Iron Co., Dayton, Ohio; Robert J. LaMarche, American Malleable Castings Co., Marion, Ohio; W. H. Moriarty, National Malleable & Steel Corp., Cleveland; K. M. Smith, Lancaster Malleables & Steel Corp., Lancaster, N. Y.; John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.; Frank E. Shumann, Lehigh Foundries, Inc., Easton Pa.; B. A. Dollens, Saginaw Malleable Iron Div., General Motors Co., Saginaw, Mich.

Announces Aircraft Gas Turbine Project

Trenton, N. J.

• • • **One of the largest** government-sponsored aircraft gas turbine experimental projects in the country is being undertaken by the De Laval Steam Turbine Company, Trenton, N. J.

H. L. Watson, De Laval president, formally announced completion of plans for the project, which is being carried out exclusively by the recently organized De Laval Aircraft Gas Turbine Division.

While details of the new aircraft gas turbine could not be made public, it was disclosed that the project involves, among other features, a new and unusual concept of compressor and gas turbine design.

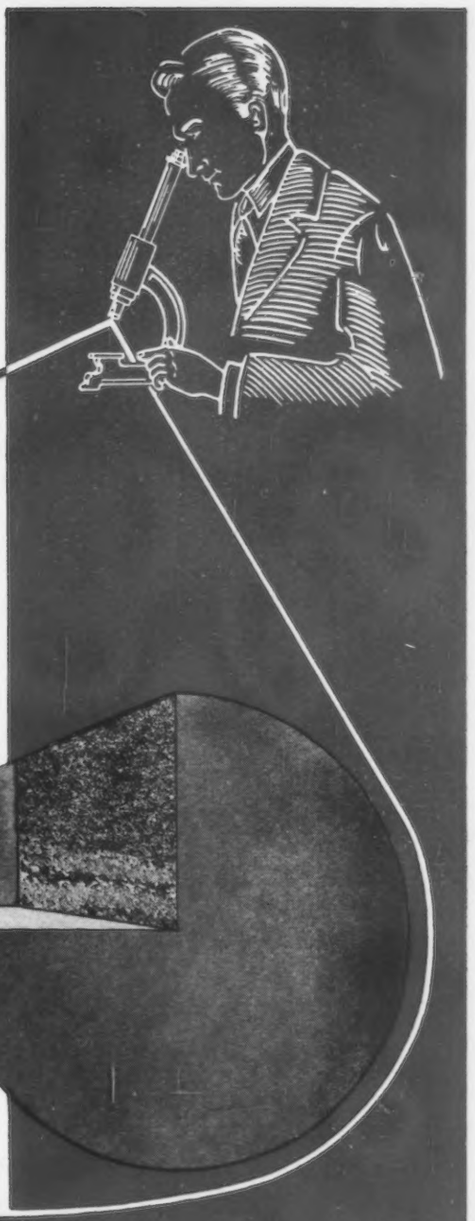
The new aircraft gas turbine designs are identified with Rudolph Birmann, consulting engineer, who for many years prior to the war was in charge of De Laval turbine design and, since 1937, has been prominently associated with research, design and manufacture of aircraft compressors and gas turbines.

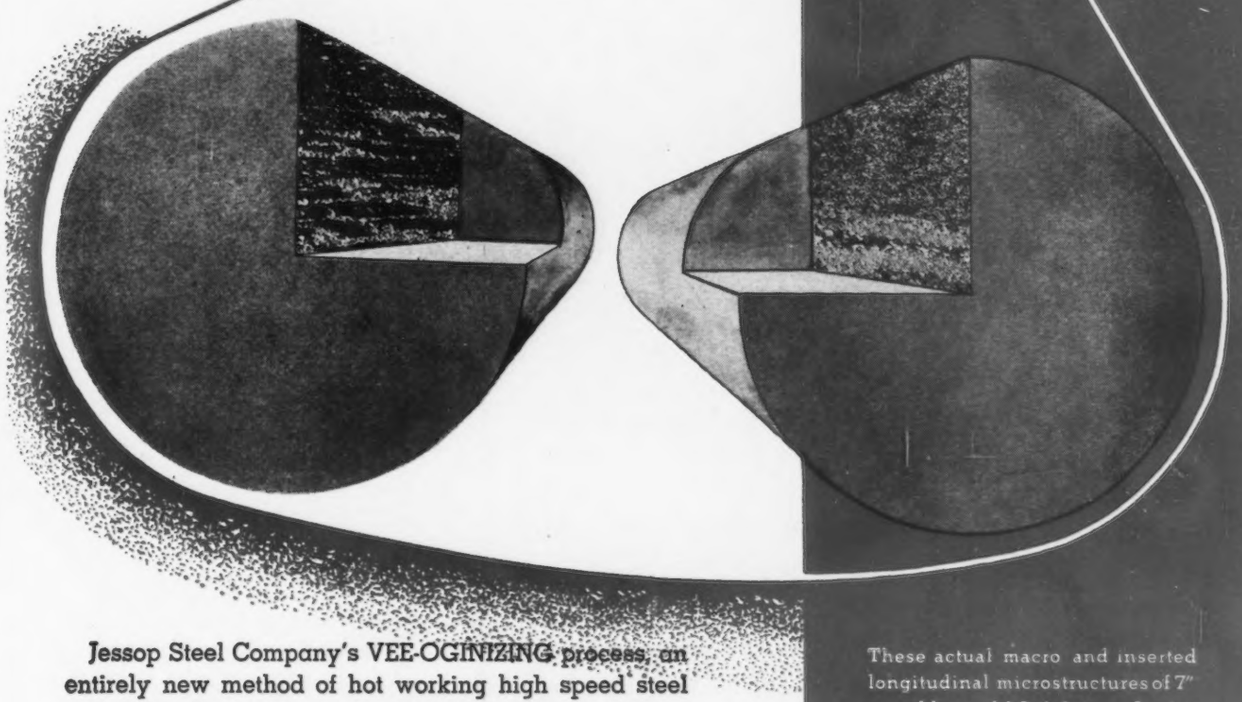
JESSOP

New Process

VEE-OGINIZED

HIGH SPEED STEELS





Jessop Steel Company's VEE-OGINIZING process, an entirely new method of hot working high speed steel rounds in diameters greater than four inches, yields a more homogeneous cross sectional carbide distribution than is possible with conventional hot working methods. VEE-OGINIZING high speed steel prevents center rupture and assures uniformity in heat treating results. VEE-OGINIZED High Speed Steel will benefit you by savings in machining time, savings in machining costs, and savings in metal. Let Jessop's new process simplify your high speed steel problems. Write for detailed information.

These actual macro and inserted longitudinal microstructures of 7" round bars of 18-4-1 type Jessop Supremus High Speed Steel illustrate the outstanding differences between the conventional method of hot working and the new VEE-OGINIZING process. The bar on the left was processed by conventional methods; bar on the right produced by Jessop's VEE-OGINIZING process. Photographs reduced one-half.

JESSOP STEEL COMPANY

WASHINGTON, PA.

THE CHARM OF A

Beautiful Finish

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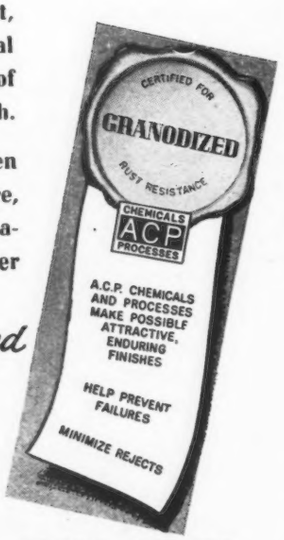
Spray Granodizing metal surfaces assures a durable, lustrous paint finish. The smooth, tight, hard, phosphate coating anchors paint to the metal for permanent protection; preventing the spread of rust from accidental injury to the paint finish.

The appealing beauty of the paint finish when applied to a Granodized surface will endure, whether it be the finish of automobile, refrigerator, washing-machine, kitchen cabinet or other products constructed of sheet metal.



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MANUFACTURERS OF INHIBITORS AND METAL WORKING CHEMICALS

AMERICAN CHEMICAL PAINT CO.

AMBLER ACP PENNA.

Heavy Casting Backlog Expected to Sustain High Foundry Output

Chicago

• • • **An unprecedented heavy backlog** of orders for castings of all types will keep American foundries running at capacity for 2 yr, it was said here by S. C. Massari, technical director, American Foundrymen's Assn. Barring any new labor difficulties and given ample raw materials, the demand will sustain a high level of production for 5 yr despite the expanded production facilities in the industry.

Wartime expansion was largest in the steel casting field. Capacity for production of commercial steel castings increased from 1,399,907 net tons in 1940, to 2,448,329 tons in 1943, not including captive foundries. Production of steel castings in 1940 averaged 50 pct of capacity and increased to 94 pct in 1941. Production fell to 79 pct of capacity in 1943. Average monthly production of steel castings in 1940 was 66,496 net tons, which was increased in 1944, the peak year, in which the lowest monthly output was 131,944 net tons. The month of greatest production in 1944 was 175,626 net tons.

The gray iron portion of the casting industry has been in an unfavorable price position because of the sequence of events caused by the war. During the first part of the war, gray iron castings were not in demand and many shops, including those owned by the automotive companies, were practically closed. It soon became apparent to the armed services, however, that transportation equipment as well as armored vehicles were needed with a subsequent heavy demand being made on the gray iron foundries.

With the creation of OPA, the gray iron foundries found themselves saddled with orders of tremendous volume which by circumstances were based on pre-war prices. The unfavorable price picture in gray iron castings still remains in many cases, so that these particular foundries have been forced to selective production of only the items on which some profit can be made.

Manufacturers of equipment in which gray iron castings are used

35 YEARS PUT HANDLING EXPERIENCE TO WORK FOR YOU

A pioneer in the materials handling field, Mercury has over 35 years in the designing, manufacturing and installation of materials handling equipment. This experience is engineered into every Mercury Tractor, Trailer and Lift Truck.

FORK TRUCKS

Available in the following models:

"JEEP" Sit Down, Center Control Fork Truck: 2000 lbs. capacity. Easily maneuvered in limited areas.

"YAK" Center Control Fork Truck: 4000 lbs. capacity. Rugged design.

"YANK" Center Control Fork Truck: 6000 lbs. capacity. Tough continuous service.

ELEVATING PLATFORM TRUCKS

Available in the following models:

"JUNIOR" Models: Low, high and telescopic lift types. 4000 lbs. capacity.

"SENIOR" Models: Low, high and telescopic lift types. 4000 lbs. capacity.

"STANDARD" Models: Low, high and telescopic lift types. 6000 lbs. capacity. Sturdy design.

"MOGUL" Models: Low and high lift types. 10,000 lbs. capacity. Designed for unusually heavy loads.

TRACTORS—TRAILERS

Available in the following models:

"TUG" Electric Tractor: Powerful compact tractor available in twin-wheel and 4-wheel models, medium or heavy duty.

"BANTY" Gas Tractor: Most compact tractor made, yet develops a draw bar pull in excess of 2000 lbs.

"HUSKIE" Gas Tractor: A powerful, 6-cylinder, 4-wheel tractor. Built to haul any wheeled load it might encounter in industry.

"SUPER-HUSKIE" Gas Tractor: Dual, rear-wheeled industrial tractor powered with 6-cylinder engine. Built for severe industrial service.

TRAILERS: Available in castor or 5th wheel steer, platform or side dump types.

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TRACTORS—TRAILERS—LIFT TRUCKS

FREE: Mercury "Pocket-Catalogue"

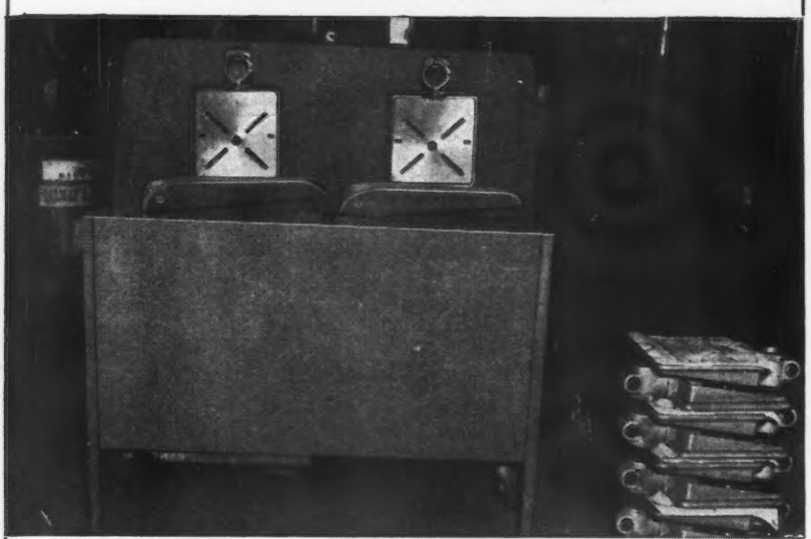
For complete data on all Mercury equipment, including the latest additions to Mercury's expanded materials handling line, request Bulletin 201-6.

Detroit Manufacturer Saves $7000 a month with TECTYL

RUST PREVENTIVE

Rust damage was costing this prominent manufacturer* of drill press table tops $7000 per month. Damaged units had to be reground; some were too badly marred to be salvaged. Since using Tectyl 511 to rustproof these parts, this loss has been eliminated. Table tops for drill presses are now safely stored up to six months after simple two-step protection.

**Name of this manufacturer will be given on request.*



After grinding parts on Blanchard Grinder they are first immersed in hot water bath (160°-180°). Next, parts are given a cold dip in Tectyl 511. They are then ready for storage — safe against rust until needed.

Tectyl is made in many specialized types

There is a Tectyl solution for every rust problem. Tectyl — not a paint — leaves a thin, transparent film that protects metals against rust and corrosion for as long as two years. Tectyl is effective indoors or outdoors — in fresh and salt atmospheres.

Tectyl can be sprayed, brushed or flushed on, or parts can be dipped. Tectyl need not be removed for inspection of surface. Tectyl can be removed easily at any time with kerosene, petroleum solvent or alkali wash. For detailed information, write, stating type of rust problem encountered in your plant.

VALVOLINE TECTYL *ENDS RUST*

FREEDOM-VALVOLINE OIL COMPANY

Dept. 25H, Freedom, Pa. — Cincinnati - New York - Washington - Toronto - Pittsburgh - Atlanta
Detroit - Chicago - Los Angeles - San Francisco - Portland - Seattle - Vancouver, B. C.

are finding it difficult to place orders for small or light castings made out of gray iron. Small size pressure castings, on which there is considerable loss by reason of exacting specifications, are not being made by many foundries formerly in that business. Despite the unfavorable price picture, gray iron castings were maintained at high levels throughout 1945 and the first quarter of this year.

Actual shipments of steel and malleable castings have declined considerably from 1944 levels but this is due in part to the shortage of pig iron and scrap available to that industry.

Use of precision castings by manufacturers is increasing but is not a large factor of the total tonnage produced. Such specialty items require very close tolerances and have usually been confined to metals that are difficult to machine or otherwise shape. Shortages of pig iron are the biggest headache in the foundry industry today. Shortages of coking coal also enter into the picture and many foundries are operating on a curtailed basis. Given sufficient raw materials, improvements made by the foundries during the war will permit sustained production of larger tonnages than ever before produced during peacetime.

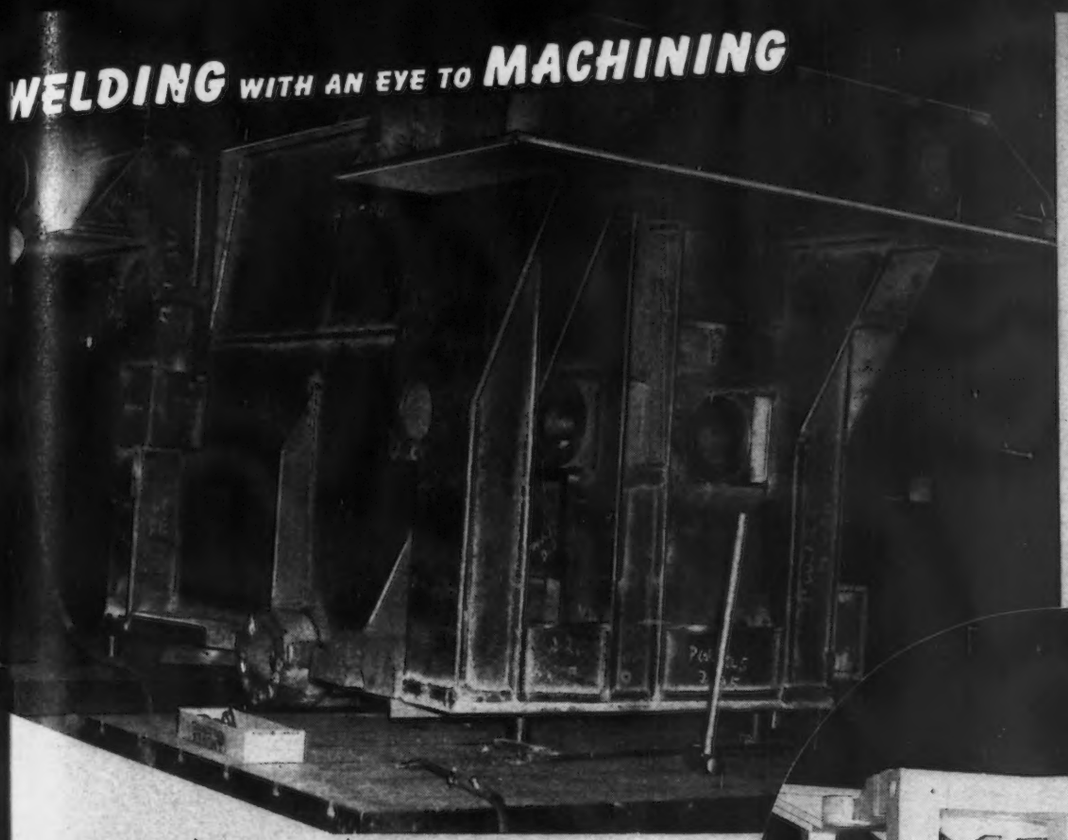
Rolls-Royce Reports On Auto and Aircraft Work

London

• • • **Capt. E. C. Eric Smith, M.C.,** chairman of Rolls-Royce, Ltd., in his statement at the annual general meeting of the firm, said that the peacetime program for resumption of motor car manufacture and for development of aircraft engines for civil aviation was now well under way.

He mentioned that the company's gas turbine engines were used to power the Gloster Meteor aircraft which regained the air speed record for Britain. A policy of further development in the field of gas turbines and jet propulsion was being vigorously pursued. The company's works at Crewe, Cheshire, have been converted from aircraft to automobile production, and the Rolls-Royce Silver Wraith and the Bentley Mark VI are now being manufactured, both of which models are completely new designs.

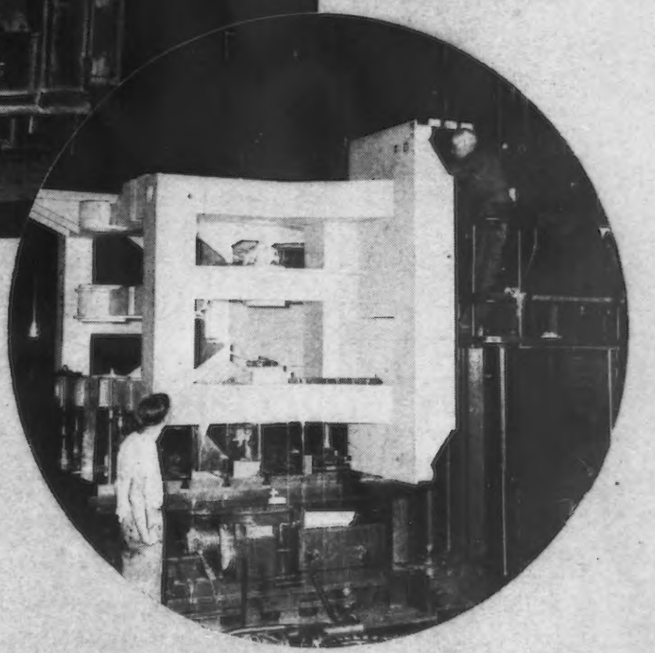
WELDING WITH AN EYE TO MACHINING



Rigid weight and tolerance control—torch cut bearing holes and knockouts minimize stock to be removed—saves costly machining time in this 13 ton mechanical press bed.

Milling an internal surface (*below*)

Multi-surface milling and facing is possible with this machine without any major change of setup. The indexing table permits swinging the part through 360 degrees of arc, with but a few minutes time lost.



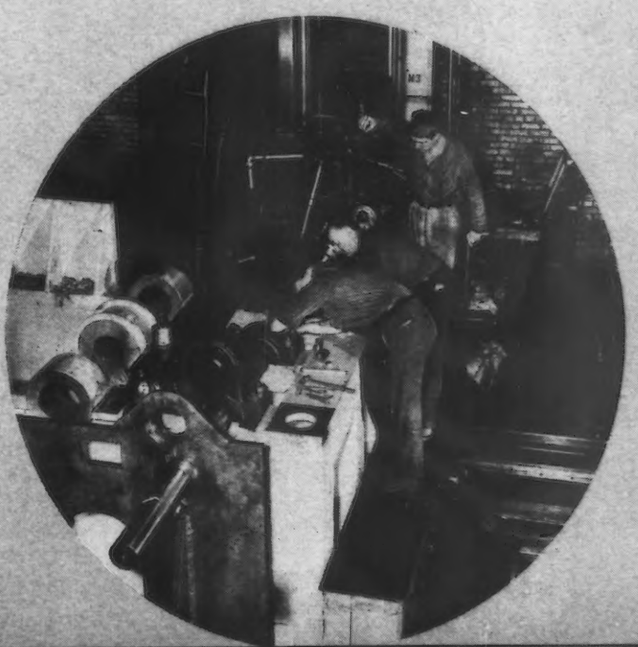
DANLY FABRICATES HEAVY *PRESS BEDS*

Completely equipped welding and machining divisions make Danly a natural for the production of heavy press fabrications and other large machinery parts. Welding facilities include positioners, layout and setup tables, machine torch cutters, handling and normalizing equipment.

Accurate detailing and sub-assembly breakdown minimizes tolerance accumulation—lessens distortion—speeds the job to the machining stage.

Ideal for machining large structures, the floor type boring mills *right* combine precision with great versatility. Equipped with indexing tables for fast setup and multi-surface machining, these boring mills are examples of the type of equipment Danly offers for faster, better production of press components.

Simple tooling where required is generally employed by Danly to reduce setup and machining time. This bar-holding fixture expedites the line boring operation of four bearing holes. *Lower right.*



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Welded and Machined at Lower Final Cost

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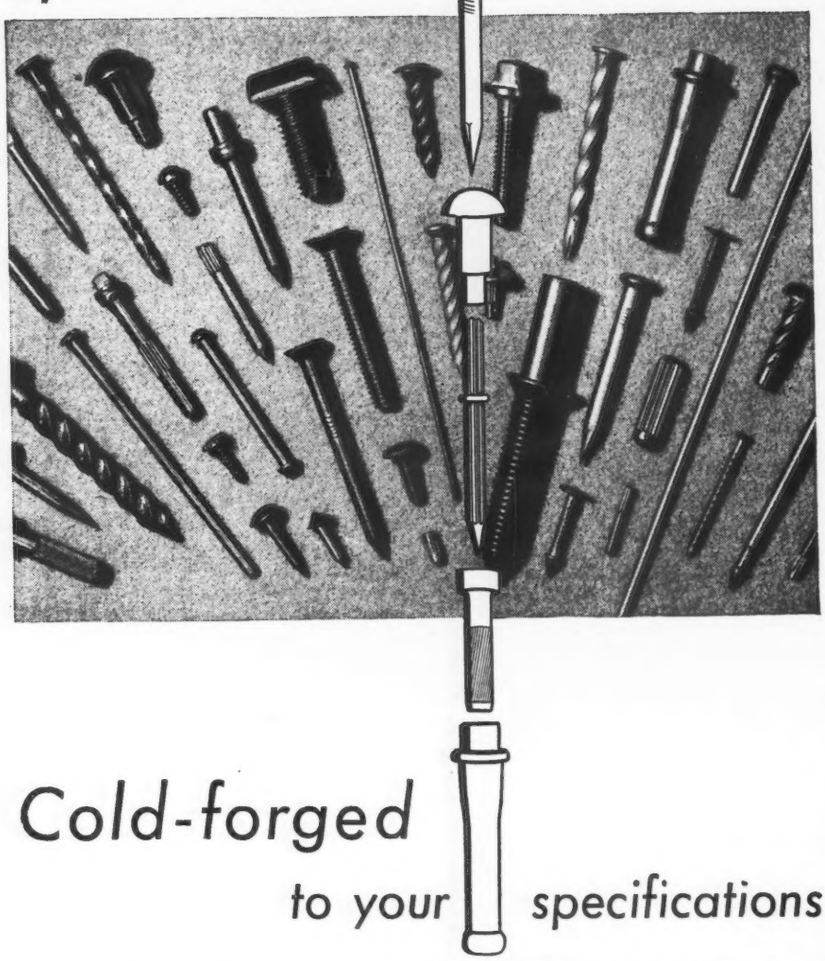

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To meet your requirements we have available a large selection of metals and sizes and almost a century of experience in working them.

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SPECIAL NAILS RIVETS SCREWS
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Special nails, rivets, screws and threaded parts

New Pneumatic Fatigue Testing Development Described at Meeting

Schenectady

• • • **A pneumatically** operated fatigue testing machine, whose operating principle is very similar to that of a slide trombone, was described by its developer, F. B. Quinlan of the Schenectady works laboratory of the General Electric Co., at the recent Buffalo meeting of the American Society for Testing materials.

Originally developed to test gas turbine buckets, the device has proved so efficient and adaptable that it will undoubtedly have wide peacetime applications, Mr. Quinlan said.

The operating mechanism of the new instrument is extremely simple, consisting of a tuned air column in which the tuning is accomplished by decreasing the length of the air path, much as a trombone player changes the tone of his instrument by moving the slide.

The part to be tested is placed in such a position between the two air paths or tubes that the air from the open ends strikes on the upper end of the sample piece, setting it to vibrating. Since the piece vibrates at the same frequency as the note in the testing trombone, and air is continually fed through the tubes, the air impulses will cause continuous vibration of the test piece. Adjusting the tube length so that the air in them vibrates at the same frequency as that of the test sample makes it possible to produce very large and stable amplitudes of vibrations with comparatively small amounts of air.

The sample vibrates, of course, until it fatigues to the extent that its vibrations are out of phase with those of the tuned air and a break occurs.

The pneumatic fatigue tester has produced stresses as high as 100,000 psi, Mr. Quinlan said in his talk, with no more air being used than that supplied by the average vacuum cleaner. The tester has no parts to wear out, as nothing moves but the part to be broken. Three different models have been built, the one described, one that has proved especially effi-

ANNOUNCING

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STAINLESS STEEL TUBING

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*Other Analyses Available on Application.

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GLOBE TUBES

STEEL TUBES CO.
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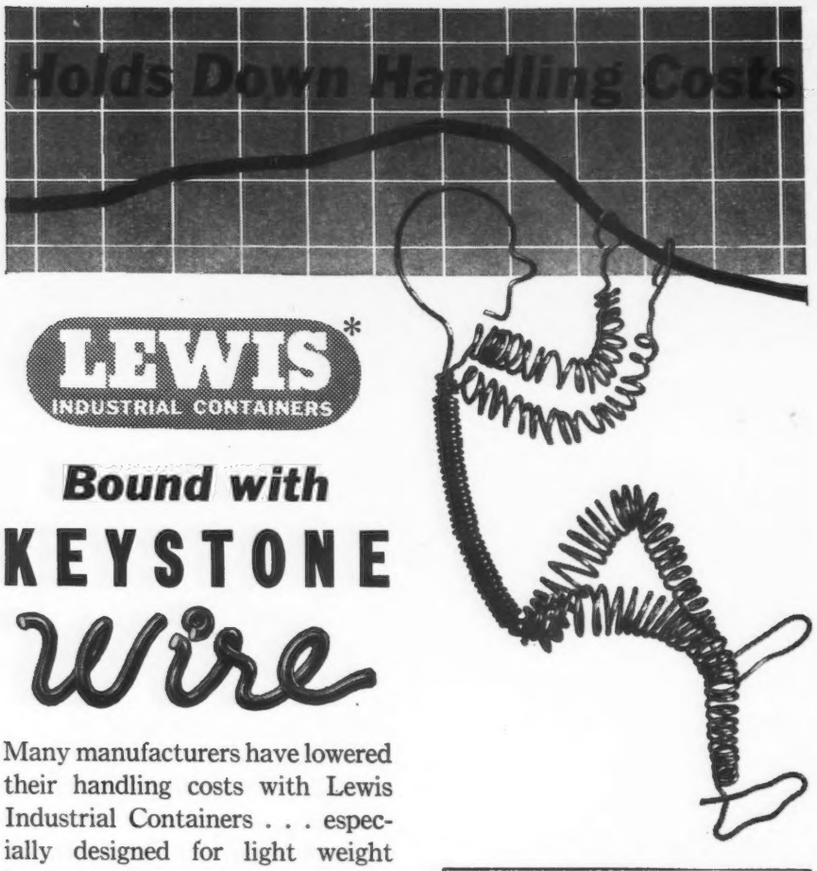

LEWIS* INDUSTRIAL CONTAINERS

Bound with KEYSTONE Wire

Many manufacturers have lowered their handling costs with Lewis Industrial Containers . . . especially designed for light weight hard-to-handle stampings, castings and assemblies.

These durable boxes are wire-bound for increased strength, with a saving in weight for easier handling. The weight factor is important because the containers are lifted and moved many times a day. Every pound saved means faster handling, reduced worker fatigue and increased production.

We are indeed proud that Keystone wire fits into the weight-saving, stronger design of Lewis Industrial Containers.

Whatever the wire need, Keystone can normally supply it.

**G. B. Lewis Company*
Watertown, Wisconsin

KEYSTONE STEEL & WIRE CO.
Peoria 7, Illinois

Special Analysis Wire for All Industrial Uses — SAMSON SPRING WIRE — Coppered, Tinned, Annealed, Galvanized

cient for torsion testing, and one for strip testing. All of them operate on the same principle, but differ in size and arrangements for holding the piece to be tested. With the exception of the strip fatigue machine, all parts may be tested at temperatures from below zero to 1700 F.

Current research with the pneumatic tester is providing preliminary data which indicate that by using a recording frequency meter, the chart will show what appears to be a point of incipient failure. This data, of course, is extremely valuable to the designer and engineer. Brittle materials show this point of incipient failure to be very close to that of complete fracture, the author pointed out in conclusion, but in ductile materials it appears long before visible fracture becomes apparent.

Founders Elect Officers

Cleveland

• • • **The Malleable Founders'** Society, at its recent annual meeting, elected the following officers to hold office until June, 1947: Frank E. Shumann, Lehigh Foundries, Inc., Easton, Pa., president; Wilson Moriarty, National Malleable & Steel Castings Co., Cleveland, vice-president; H. S. Colby, Malleable Founders' Society, Cleveland, executive vice-president; and John J. Harant, Malleable Founders' Society, secretary-treasurer.

At the same meeting, the following were elected to the board of directors of the organization: Frank E. Shumann, Lehigh Foundries, Inc., Easton, Pa.; Wilson Moriarty, National Malleable & Steel Castings Co., Cleveland; Cal. C. Chambers, Texas Foundries, Inc., Lufkin, Tex.; R. N. Cole, Canton Malleable Iron Co., Canton, Ohio; A. F. Crone, Acme Steel & Malleable Iron Works, Buffalo; D. R. Evans, Northern Malleable Iron Co., St. Paul, Minn.; Anthony Haswell, Dayton Malleable Iron Co., Dayton, Ohio; H. M. Laws, New Haven Malleable Iron Co., New Haven, Conn.; F. S. O'Neil, Link-Belt Co., Indianapolis; K. M. Smith, Lancaster Malleables & Steel Corp., Lancaster, N. Y.; P. H. Vincent, Erie Malleable Iron Co., Erie, Pa., and Brinton Welser, Chain Belt Co., Milwaukee.

. . . with only 2 light coats

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Recent production experience with Titanium enameling iron demonstrates . . . more clearly than ever before . . . the unique advantages of this new advance in the enameling industry.

With Titanium enameling iron—the cover coat, in white or color, is satisfactorily applied directly to the base metal. Ground coats are usually unnecessary when proper shop conditions are observed. As a result, production is doubled, often tripled—capacity boosted—and substantial savings effected.

In addition, products can be made with thin finishes superior to chipping and breaking. Resistance to thermal shock at high temperatures is retained. Service life is extended. There is no enamel boiling and little or no sagging or warping at enameling heats. For Titanium stabilizes (or fixes) the carbon in steel. Resultant carbonless iron, having no yield point, is especially satisfactory for deep drawing.

Both manufacturers of enamelware and steel find these and other features of this new Titanium enameling iron worth investigating. It's easy to get the facts. Our field engineers and research organization will welcome the opportunity to cooperate. Write today. There's no obligation, of course.

THE *Merit Mark* OF METAL

TAM ZIRCONIUM TITANIUM PRODUCTS Registered U. S. Pat. Off.

Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under Trust Agreement.

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Executive Offices: 111 BROADWAY, NEW YORK CITY *General Offices and Works:* NIAGARA FALLS, N. Y.

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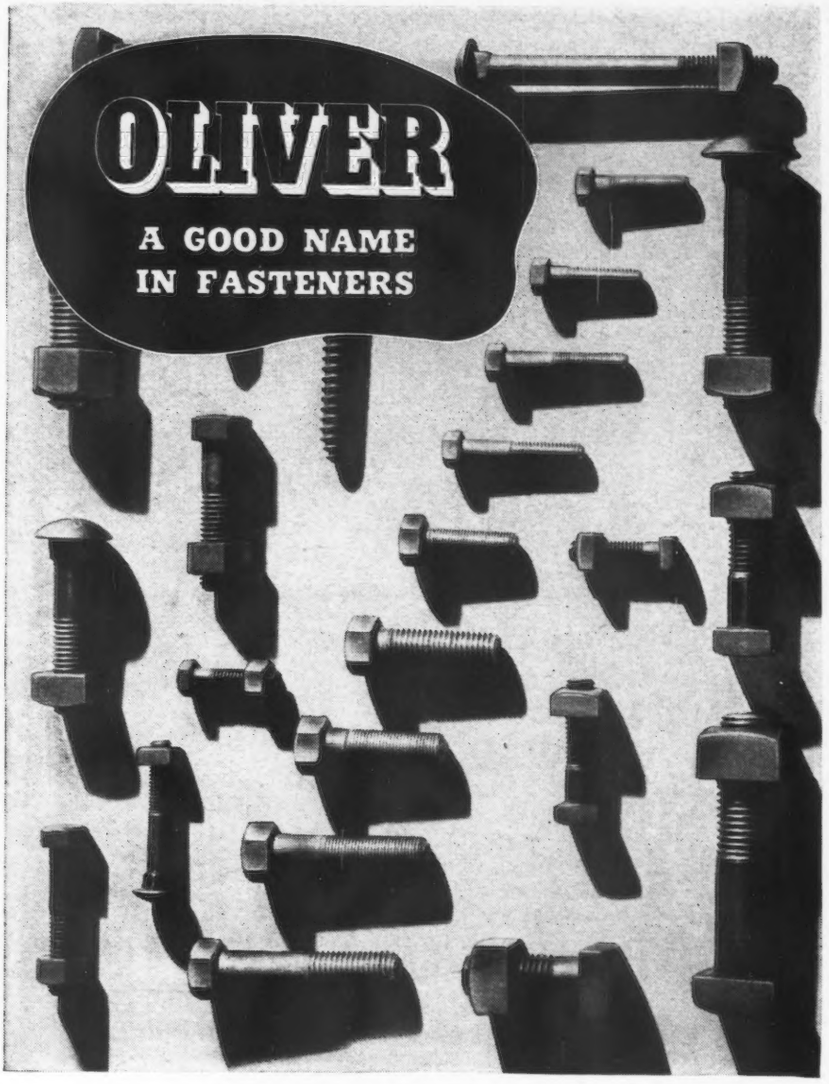

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Accurately made • Uniform • Dependable

The complete line of Oliver Industrial Fasteners includes bolts, nuts, rivets, cap screws, lag screws and special fasteners of all commercial sizes. Materials, heat treatments, protective coatings and other specialized features meet your particular needs.

Specify OLIVER Fasteners for highest quality.

OLIVER IRON AND STEEL Corporation

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Sees Expansion Trend For Special Tooling To Reduce Labor Costs

Boston

• • • **A marked trend** toward expanded special tooling, arising largely from the need for cutting labor costs, was reported to directors of the National Tool & Die Manufacturers Assn. by president Richard F. Moore, at a 2-day meeting here recently.

Mr. Moore, who is also president of the Moore Special Tool Co., Inc., Bridgeport, Conn., said the trend toward special tools is particularly noticeable in the case of specially built machines. By installing one special purpose machine to perform a number of operations previously done on separate machine tools, the manufacturer can replace the several employees formerly needed by a single man, he said.

"More complex special tooling is also being utilized to slash labor costs through the use of one progressive or compound die in the place of several simple dies," Mr. Moore declared.

Excellent results from the apprenticeship training program of the NTDMA were reported to the board by Willis Ehrhardt, partner, Ehrhardt Tool & Machine Co., St. Louis, vice-president of the association and chairman of its Fact Finding Committee.

In a recent survey, 280 typical tool and die shops throughout the country stated that they are training 1111 apprentices. Of these, three out of every four are veterans. Extension of present apprenticeship programs promises eventual relief from the current shortage of tool and die makers, die sinkers and men of like skill.

NTDMA is devoting much attention to the development of a set of principles of business conduct, aimed at establishing standards of fair practice in keeping with the special services rendered by tools and die manufacturers as production consultants, according to a progress report submitted by O. J. Grandahl, general manager, Grandahl Tool & Machine Co., Hartford, and chairman of the committee on business conduct.

Announcement was made by George S. Eaton, executive secretary, that arrangements are under way for the association's annual

HOW TO GET A NEW REFRIGERATOR . . .

From Your Own Scrap-Pile

The shortage of scrap metal, desperate during wartime, is still serious. The production of many of the things you need is being slowed up . . . will be interrupted unless steel mills continue to get a larger supply of scrap iron. More than half of the steel used in America requires scrap for its production. Call your scrap metal dealer . . . gather and sell worn-out iron and steel of all types. This is necessary to help provide uninterrupted production of steel and things made of steel. Help speed delivery of many of the items on your *want list* . . . turn in your scrap today.

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GENERAL OFFICES • KOKOMO, INDIANA

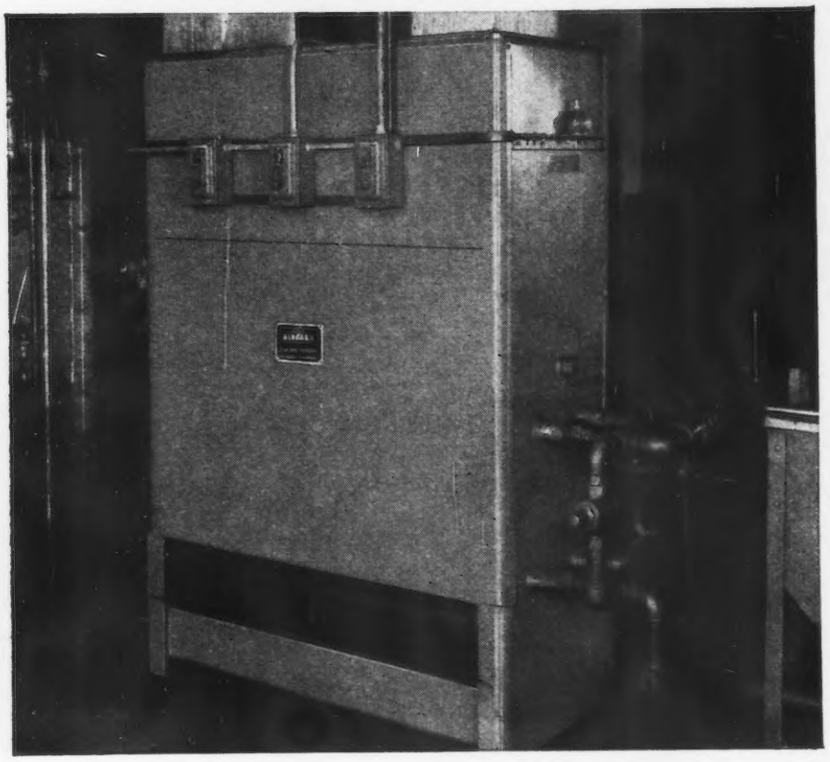
PRODUCERS OF STEEL SHEETS, including Continental GALVANIZED, COPPER-STEEL Galvanized, KONIK steel sheets, Galvanized

UNIFORM SPANGLE Galvanized, DULL COAT, Continental GALVANNEALED, ELECTRICAL, Hot Rolled Pickled and many styles of Formed Roofing

ALSO, Manufacturer's Wire in many sizes, shapes, tempers, and finishes, Continental Chain Link Fence, Nails, and other steel products

NIAGARA AERO HEAT EXCHANGER

Removes Heat at Rate of Input—gives extra capacity for Increased Production



Heat treat quenching is no longer a haphazard process when you regulate the temperature of quenching baths with the NIAGARA AERO HEAT EXCHANGER. It removes heat at the rate of input, maintaining the exact temperature to produce specified, uniform physical properties. In continuous quenching systems it speeds production.

Fast and accurate cooling is an important safety feature for inflammable baths, keeping the oil from reaching the flash point. Holding the temperature with precision, which includes the prevention of "over-cooling," is made possible by the patented Niagara "Balanced Wet Bulb" Control. And since 95% of the cooling water is saved, the NIAGARA method pays for itself in a short time with direct economies.

For complete description write for Bulletin No. 96.

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INDUSTRIAL COOLING HEATING • DRYING

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HUMIDIFYING • AIR ENGINEERING EQUIPMENT

membership meeting, which will be held at the Congress Hotel, Chicago, Oct. 23-26. Stuart H. Sinclair, sales manager, Federal Tool Corp., Chicago, is chairman of the committee on arrangements.

At a dinner meeting, A. Dudley Bach, a director of the Smaller Business Assn. of New Engand, and president, New Engand Metallurgical Corp., urged removal of most of the government restriction now "stifling the small business man." Einar Johnson, Boston Tool & Die Co., and president of the East Massachusetts Tool & Die Manufacturers Assn., acted as master of ceremonies.

Czechs Join Coal Group

London

• • • **The Czechoslovakian** Government has recently acceded to the agreement for the establishment of the European Coal Organization which was signed in London in January this year. By this accession, together with that of Poland last March, the influence of the organization has been extended to cover the eastern European coalfields.

The European Coal Organization now comprises, either as members or associates, the following 17 countries: Belgium, Czechoslovakia, Denmark, Finland, France, Greece, Italy, Luxemburg, the Netherlands, Norway, Poland, Portugal, Sweden, Switzerland, Turkey, United Kingdom, and the United States.

Coal Order Revoked

London

• • • **Britain's Essential** Work (coal mining industry) Order, 1943, is to be revoked with effect from Sept. 1. In view of the present position regarding coal supplies, the government does not consider that it can dispense with all forms of labor control in the industry, and it has decided to amend the Control of Engagements Orders, 1945 and 1946, so as to apply to men aged 18 to 50 in the coal mining industry.

This means that men between 18 and 50 will be able to change collieries but will be unable to seek work outside the industry without permission from the Ministry of Labor. Collieries will be free from restrictions upon the engagement of labor.

Information Free

(1) Stainless Steel Fasteners:

Extensive listing of stock items in stainless steel commercial and aircraft fasteners given in company's stock list; includes stock sizes of nuts, bolts, rivets, wood and machinery screws, set and cap screws, pipe fittings, nails, taper pins, cotter pins, seamless pipe, washers, etc., in 18-8; 18-8 + 2 to 4 pct Mo; type 316 and other stainless grades. *Anti-Corrosive Metal Products Co., Inc.*

(2) Cold Wrought Products:

Photographic story of products engineered and designed by Chandler is told in booklet. Production of cap screws from selection of properly adapted raw materials through painstaking manufacture, careful inspection and packaging, and prompt delivery is depicted. *Chandler Products Corp.*

(3) Bending Machines:

Art of bending and the selection of a machine are discussed in pamphlet. Bench type, production and heavy duty benders are described and illustrated. Applications of benders and specifications of sections to be bent are included. *Pedrick Tool & Machine Co.*

(4) Plastic Goggle:

Lightweight Saf-I-Shield clear plastic goggle is described in bulletin, which stresses features of perfect vision, maximum comfort, full ventilation and greater protection, as impact resistance is above U. S. government specification for glass safety lens. *U. S. Safety Service Co.*

(5) Circular Cutoff Tools:

Combination circular cutoff and chamfering tools listed in folder cover a range which will accomplish chamfering to practically any desired diameter. Designed for use on Brown & Sharpe automatic screw machines. Prices are included. *Weldon Tool Co.*

(6) Bearing Bronze:

Folder describes frictional properties available in Bearium Metal and illustrates typical bar stock sizes and individual castings. Photomicrographs show structure and lead distribution accounting for its advantages for bearings, bushings, thrust washers and other requirements involving rubbing friction. *Bearium Metals Corp.*

(7) Steam Drop Hammers:

Construction features of various models of drop hammers are detailed in bulletin No. 340 with numerous illustrations. Photographs show drop hammers in a number of leading forge shops. Dimensions and material specifications are given. *Erie Foundry Co.*

(8) Metal Cleaning:

Facts and photographs describing the pH controlled cleaning methods and materials for the metal industries are presented in bulletin. Cleaning problems found in metal processing and finishing are illustrated and discussed briefly. Kelite's suggestion service as an aid in planning cleaning systems, and the control service reports, designed to keep managers advised, are covered. *Kelite Products, Inc.*

(9) Fuel Oil Control:

Control, integrating, remote indicating and recording of heavy fuel oil are possible with the Transometer described in bulletin No. 111. Its value with other liquids, particularly viscous fluids, and for applications where wide flow variations are encountered, is stressed. *Askania Regulator Co.*

(10) No-Thread Pipe Fitting:

Procedure in joining pipe with a no-thread fitting which eliminates threading, gives reinforced pipe end and permanently tight joint, is described in pamphlet. Typical piping installations for gas and liquid, and other applications are illustrated. Specifications and list prices are included. *Dresser Industries, Inc.*

(11) Machine Tool Rebuilding:

Facilities and modern equipment of the Botwinik plant for rebuilding machines and machine tools to meet customers' requirements are described and illustrated in booklet. Examples of rebuilt and reconverted machine tools are pictured. Selected list of machine tools handled by the company as purchasing agent for industry, is given. *Botwinik Bros. of Mass., Inc.*

(12) Contract Work:

Gray manufacturing facilities for contract work are presented in folder. Production of electromechanical, radar and telephonic apparatus, etc., special model machine tools and equipment for experimental work, and execution of special tool requests from design through production of the product are among the services available. Typical examples of metal products are illustrated. *Gray Mfg. Co.*

(13) Lubricating Brush:

How the Lubro-Brush automatically lubricates and brushes taps, reamers, drills or countersinks is described and illustrated in folder. Fits all standard drill presses and readily adapts itself to punch presses, small lathes, hand millers, etc. Assembly detail shown. *Charles L. Jarvis Co.*

(14) Vibration Insulators:

Series 1022 insulators illustrated and described in bulletin are made of steel or Dural, in cup, plate or diamond models, in a full range of load-ratings. Load-deflection curves show the characteristics of typical mounts tested. *Harris Products Co.*

(15) Oilseals:

High-speed oilseals, with or without flanges, precision, Tru-circle and felt, and Greaseals, in sizes to meet standard installations and special applications are described and illustrated in catalog. Detail drawings show methods of incorporating and typical applications. Tables give standard size data. *Gits Bros. Mfg. Co.*

(16) Rotary Pumps:

Construction features of rotary pumps with pressures up to 150 psi and operating at 1740 rpm are presented in bulletin No. 10. Pumps are designed for such work as diesel fuel oil transfer work, pressure lubricating, hydraulic service, etc. Interchangeable mounting brackets and adapters are also described. *George D. Roper Co.*

(17) Cut Gears:

Equipment and manufacturing operations in production of cut gears and cut sprockets of all types are portrayed in catalog 143. All standard sizes of semi-steel and steel industrial cut gears including spur, bevel, mitre, spiral, helical, internal and worm types are listed with prices in this 272-page book. Engineering data are included. *Industrial Gear Mfg. Co.*

(18) X-ray Spectrometer:

Reprint of an article, booklet R1022, describes in detail the principles of operation of the Geiger-counter X-ray spectrometer and tells how the instrument is being used for control of cemented carbide products. Data is presented to show how analysis time has been reduced from 2 days to 35 min in some instances. *North American Philips Co., Inc.*

(19) Testing Machines:

Catalog 30 gives a comprehensive digest of the principles, construction and operation of universal testing machines for tension, compression, and flexure testing. Included are descriptions of the pendulum lever weighing system, hydraulic and electro-mechanical loading systems, testing ranges, with specification details. L-type and Lo-Cap machines, as well as recorders, proving rings and accessory tools are presented. *Tinius Olsen Testing Machine Co.*

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature. The offer is good for only two months.

8/15/46

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INFORMATION FREE (Continued)

(20) Machine Mountings:

Information on a complete line of machinery mountings, called Vibro-levelers, is given in bulletin No. BU50. Illustrated examples show how the levelers are employed to stop transmission of vibration from small equipment such as bench grinders, and heavy duty equipment, such as punch presses and drop hammers. *Bushings, Inc.*

(21) Metal Cleaners:

Prep products made to provide firm and lasting bond between metal surfaces and paint finishes are discussed in bulletins. Metalprep, a wipe-off type rust remover and cleaner recommended for bulky items, and Alumiprep, used for preparing aluminum before painting and spot welding, are treated in separate bulletins. *Neilson Chemical Co.*

(22) Wire Spooling Machines:

Illustrations and descriptions of spooling machines built in single or double end construction, in either single or multiple units, given in catalog. Detailed views show process of wire reeling. Spoolers for winding wire on sticks, taper winding, for winding plastic tape, etc., are among the machines described. Standard models accommodate from 1 to 12 spools. *Fidelity Machine Co.*

(23) Drills:

Wide variety of drills for almost every purpose is listed in 88-page catalog. Drills for plastic, 12-in. Longboy drills, drill blanks, centerless ground reamers and solid carbide drills are included. The Ace drill process grinding from the solid after hardening is described. *Ace Drill Corp.*

(24) Cap Screws and Bolts:

Pertinent information on cap screws, bolts and nuts given in catalog No. 46 includes dimensions, weights, prices and other specifications. Washers, rivets and specialties are also listed. *Triplex Screw Co.*

(25) Machinery Steel:

Wall chart, Machinery Steel Selector, is a guide to selection of proper steels for machine parts. Data give ready-for-use physicals of Elastuf steels, and practical data on their use are also included. Government specifications and frequently used ASTM standards are listed. *Horace T. Potts Co.*

(26) Self-Clinching Fasteners:

How PEM self-clinching fasteners provide a steel thread in aluminum, copper, or brass sheet assembly jobs is described in folder. Positive lock prevents turning of fastener. Table gives sizes. *Penn Engineering & Mfg. Corp.*

(27) Packaging:

"Blue Book of Packaging" discusses round steel reinforcement for cartons, boxes, crates, etc., and all types of shipping in fiber, corrugated or wood containers. Illustrations of equipment show possibilities in packaging reinforcement. Charts give shippers information on strapping methods. *Gerrard Steel Strapping Co.*

(28) Plastics:

Classification of plastics molding materials as an aid to selection of proper plastic materials for special applications is discussed in catalog. Designs and illustrations of plastic products include knobs, bushings, electrical parts. Chart gives specifications and properties. *Waterbury Companies, Inc.*

(29) Cranes:

Catalogs No. 77 and 78 describe construction features of air-controlled Diesel or gasoline locomotive cranes and utility rail cranes. Illustrations show cranes in operation. Dimension and capacity figures are given. *Orton Crane & Shovel Co.*

(30) Refractories:

Chart lists essential information on Missouri refractories since 1900, giving name of product, size, PCE, manufacturing process and recommended applications. *Chicago Fire Brick Co.*

(31) Electropolisher:

Use of the Cenco-Hangosky electropolisher for polishing and etching metallurgical specimens of ferrous and nonferrous metals and alloys of many types is presented in bulletin 65. Photomicrographs show specimens prepared by the polisher. *Central Scientific Co.*

(32) Tool Grinding Fixture:

An all-purpose tool grinding fixture designed for precision grinding of lathe tools, screw machine form tools, shaper, planer, threading or any angle cutting tools, is described in leaflet. Illustrations show how the fixture, featuring a tilting block, holds cutting tools for grinding to insure accuracy and longer life of the tool. *George Scherr Co.*

(33) Weld Heat Calculator:

For cases where high carbon and alloy steels need to be preheated for best quality welds, a disk calculator for figuring welding preheat and interpass temperature is available with a pamphlet of instructions for its use. *Lincoln Electric Co.*

(34) Retaining Rings:

Catalog No. 4 highlights new developments in retaining rings, and contains technical data concerning varied applications of seven basic types. Before and after design sketches of basic and unusual applications show how Truarc rings can be used to save space, weight, machining and assembly costs. Comparative charts on material characteristics, critical dimensions, thrust loads and impact tests are included. *Waldes Kohinoor, Inc.*

(35) Mechanical Stokers:

A photographic tour of the Standard Stoker plant is presented in publication No. 69, and covers the company's facilities for producing mechanical stokers. From foundry practice, through forge, plate and machine shops, to testing and inspection of products and finally, the shipping procedure, plant operations are presented in pictures. *Standard Stoker Co., Inc.*

(36) Pressure Switches:

Complete information and engineering details on various types of thermostats and pressure switches are outlined in a series of bulletins. Illustrations and dimensional drawings of immersion type thermostats, for home and industrial use, and for air temperature control, are included, as well as descriptive material and illustrations for electric pressure and pressure vacuum switches. *United Electric Controls Co.*

(37) Jacks:

Various models and types of ratchet, screw and hydraulic jacks are described and illustrated in bulletin 1040D. Special features of each jack are stressed; sizes and price lists are included. *Buda Co.*

(38) Grinding Wheels:

B-5 resinoid wheels for fast, smooth cutting action and long life are featured in illustrated booklet. Suggested specifications for foundry grinding are given and size and price tables of the various wheels are included. *Norton Co.*

(39) Steel Forgings:

A pictorial review of the history, manufacturing facilities and war production of the Pittsburgh Forging Co. is covered in catalog. Typical products of the plants, forging facilities and controls are described and illustrated. Outstanding manufacturing facilities for the production of railroad equipment at the Greenville Steel plant and adaptability of these facilities to all types of riveted and welded steel products are also presented. *Pittsburgh Forgings Co.*

(40) Threading:

A comprehensive threading manual, catalog No. 3, is an authoritative single source of top information to aid machine designers and production engineers in determining the proper class of fit and how to use taps correctly. The manual, arranged in the form of tap and thread terms, covers 63 classifications. Illustrations, sizes, prices, discounts, tolerances and thread limit tables are given. *Hy-Pro Tool Co.*

(41) Coated Abrasives:

The effect of moisture on the work value of glue-bonded coated abrasives is the subject of bulletin No. 5. Answers to problems, as well as the causes and analysis of usual complaints are discussed. *Clover Mfg. Co.*

(42) Milling Machines:

Construction features of a line of vertical and horizontal knee-type milling machines for faster and more efficient milling of steels and nonferrous metals are described in catalog No. CRM-20. Typical operations of the various models are shown in illustrations. Dimensional drawings and general specification tables are included. *Kearney & Trecker Corp.*

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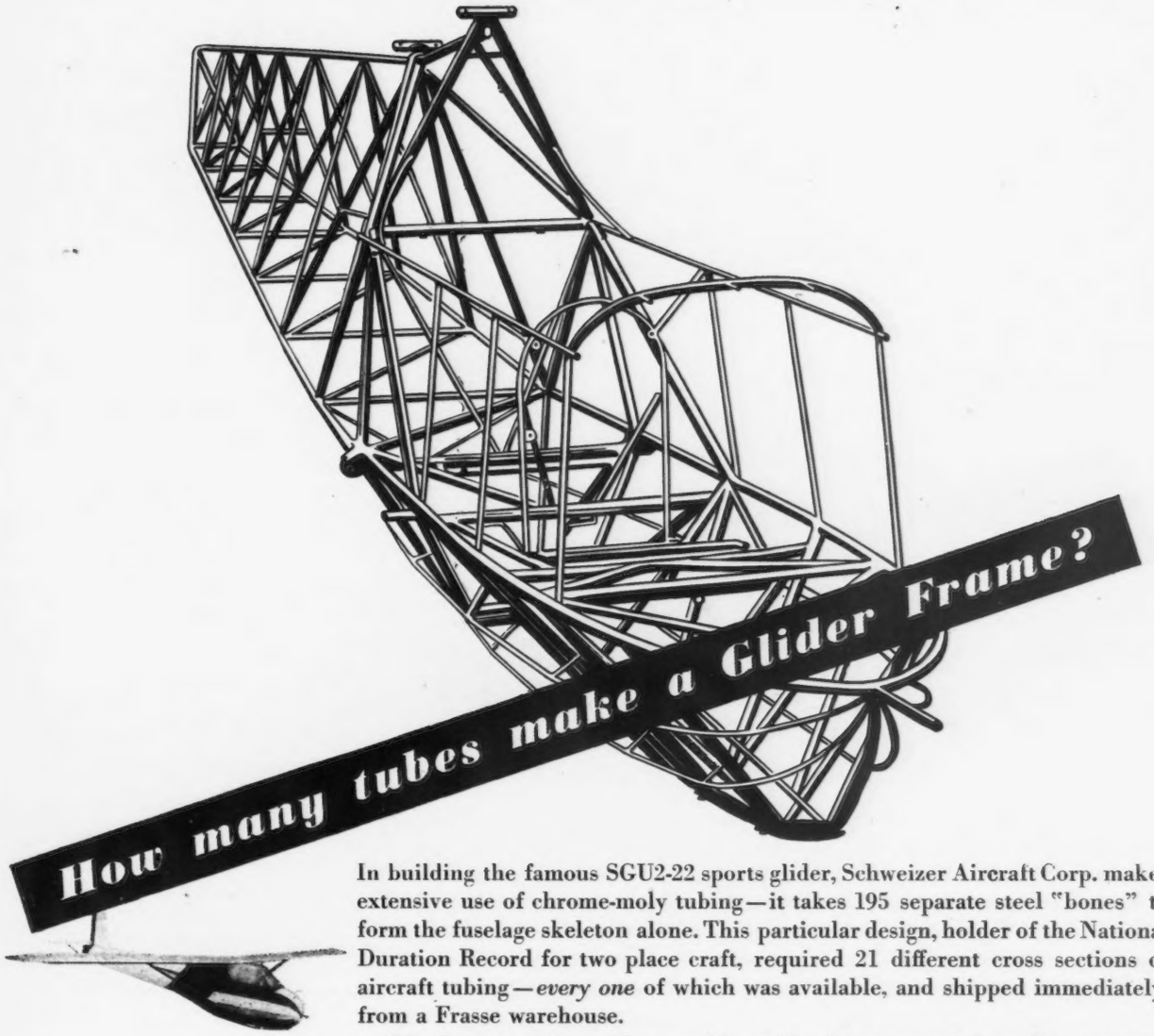

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WAA Reports Sales Of Two Large, Some Small Surplus War Plants

Washington

• • • **Approximately $1 million** is expected to be spent by the Solvay Process Co. of New York in equipping the Buckeye Ordnance Works, South Point, Ohio, to produce solid ammonium nitrate for the commercial fertilizer industry. The plant, which was constructed by the government during the war at a cost of $40 million, was recently acquired by Solvay for the purchase price of $13,293,000.

At the same time, WAA announced the sale of the Dixie Ordnance Works, Stirlington, La., to Commercial Solvents Corp. of New York for $5,512,500. For the present, the firm expects to produce ammonia for the fertilizer industry. Among the other war plants included in war plant sales by WAA since July 1, most of which were small plants, were the following:

Lempco Products, Inc. plant at Byesville, Ohio, for $385,000, to General Electric Co. for the manufacture of incandescent lamps.

Diebold, Inc. thin armor plate plant at Canton, Ohio, sold to Babcock Printing Press Corp., New London, Conn., for $200,000, for manufacture of printing presses and allied equipment.

Kollmorgan Optical Corp. plant at Long Island City, N. Y., to Metalock Casting Repair Service, Long Island City, for $96,350. The new owners will conduct special process repairing of cracked and broken castings and machine parts of both ferrous and non-ferrous metals.

A single building at the Worcester, Mass., aircraft training center, operated during the war by Wyman-Gordon Co., sold for $48,500 to Dewalt Machine & Engineering Co. for manufacture of oil burners.

Plymouth Steel Co.'s alloy steel plant at Detroit, sold to Plymouth which will continue alloy steel production. No equipment was included in the sales price of $47,323.

Strom Steel Ball Co. steel bearings plant at Cicero, Ill., sold to Hess Warming & Ventilating Co. of Chicago, for production of "air heating" equipment.

William B. Pollock Co. of Youngs-

town, Pa., has purchased for $60,000 the Youngstown steel mill parts assembly plant it operated during the war and will expand the production facilities.

Bassick Co. of Bridgeport, Conn., has purchased for $610,000 the United Aircraft Corp. Bridgeport plant; the new owner will convert to production of automotive hardware, office chair irons, industrial casters and caster parts and expand the payroll by 300.

Romec Pump Co. has purchased for $270,105.14 the aircraft parts plant it operated for the government at Elyria, Ohio, and will produce fuel pumps for internal combustion engines, air compressors and liquid pressure pumps.

Government-Industry Cooperation Urged

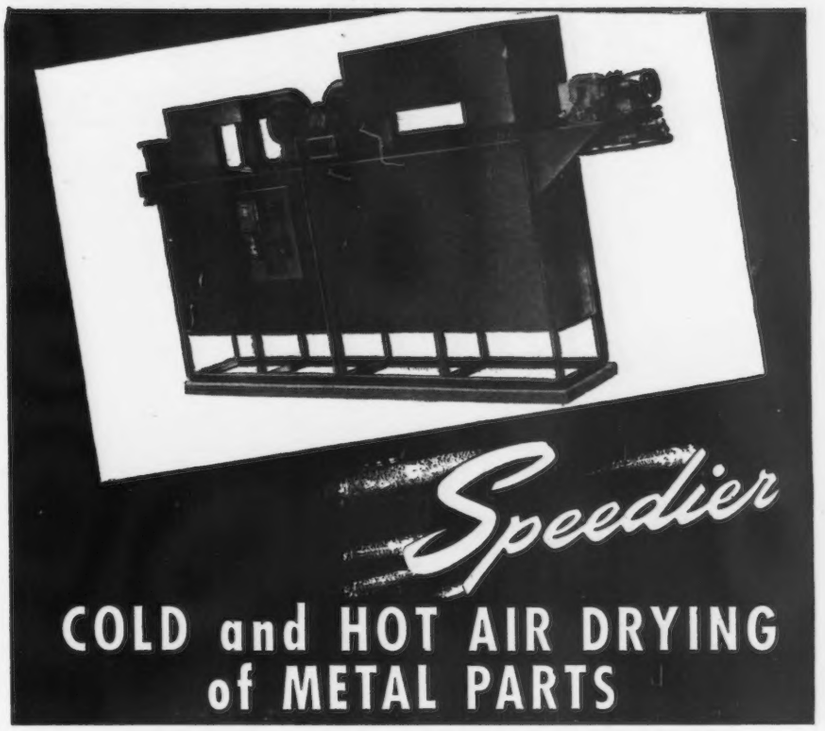
London

• • • **Lord Davidson,** president of the British Engineering Industries Assn., in a statement to the Financial Times, referred to the difficulties caused by the heavy increased export of raw and semi-finished materials needed by the engineering industry to carry out its arrears of orders.

"The time has come," he said, "when the government should take industry into its confidence to a much greater extent than is now the case.

"The fact that the June figures show some decline in these exports is no answer to the underlying problem. If the government can give a convincing reason why certain steel and nonferrous products should be sent abroad in large quantities while our manufacturers have to refuse orders for lack of these very materials, the engineering industry can be relied upon to cooperate and adapt itself to unavoidable conditions.

"While controls continue, only the government has all the information on which to decide the allocation of such materials between home manufacturers and overseas markets. Those representing the engineering industries can but point to the loss to the national exchequer through exporting semifinished materials in scarce supply, in spite of encouraging their use in finished products for which there is an equally heavy demand from overseas."



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It can be used as a single stage dryer, or it can handle a number of successive operations, alkaline, acid, or neutral. Enclosed design of machine permits efficient ventilation through exhaust blower connection when desired. Can be heated by steam, gas or electricity.

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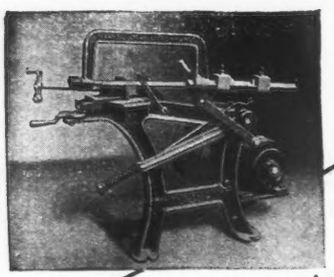

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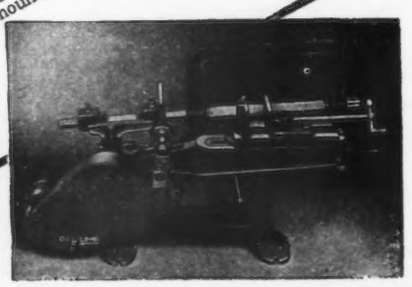
No. 1 Draw Cut Hack Saw Dry cut, 4" x 4" capacity. A sturdy saw, well-known for its dependability, economy, and invaluable service in the small shop or shop department. Simple and efficient with low original, maintenance, and blade cost.

MARVEL SAWS

No. 2 Draw Cut Hack Saw. Companion to the No. 1 but with a normal 6" x 6" capacity which can be increased to 8" x 8" by shortening the stroke with adjustable crank. The No. 2 MARVEL also has a swivel vise which is removable from the "T" slotted bed, permitting special fixtures to be mounted. Both machines are available in belt and motor driven models. Motor driven models can also be furnished mounted on portable truck.



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Orders Indicate Power Plant Capacity to Be Increased by 30 Pct

New York

• • • **Expansion of** America's electric power industry, now under way on an unprecedented scale, points to a 30 pct increase in capacity for generating electricity for industrial and home use by 1950.

Gwilym A. Price, president of the Westinghouse Electric Corp., estimated that Westinghouse sales of central station equipment will represent 27 pct of its total business in 1946. This is in contrast with the year 1944, when production of equipment for central stations, then under wartime priorities, represented less than 2 pct of the company's record production of $1 billion dollars.

Indicative of the large scale and forward-looking program of the utilities, Mr. Price pointed out, is the fact that more than 55 large utilities have placed orders with Westinghouse in excess of $500,000 each. Some orders have been placed for delivery in 1949.

Tracing the consistent upward trend in the number of customers for electricity as well as the increased per capita usage of electricity, Mr. Price said the installed generating capacity in this country today is 51,200,000 kw compared with 44,000,000 kw in 1941. The economic research department of Westinghouse estimates that by 1950 the total will be between 65,700,000 and 67,500,000 kw. On a per capita basis, today's production of electricity in the U. S. is 8 times that of the rest of the world.

The Westinghouse executive pointed to the nation's rapidly expanding rural electrification program and to the pentup demand for electrical appliances in homes as factors that will increase power demands in the years ahead. Of 5,950,000 farms in the U. S. 2,950,000 do not have electricity.

Mr. Price said that the largest central station equipment order now on Westinghouse books is for two turbine-generator units at an eastern plant, each of which will produce 150,000 kw of power. Power generation facilities in nearly every large city of the country—and in many of the smaller ones—are being expanded to meet future anticipated needs.

WAA Reports Slackness In War Plant Disposal

Boston

• • • **Inquiries and** negotiations for government-owned New England war plants have been inactive of late, according to local WAA officials. However, it is believed there is more interest in such real estate than WAA officials are willing to admit.

It it known that a Philadelphia heating furnace manufacturer is negotiating for the purchase or lease of the Reynolds Metal Co., East Springfield, Mass., wartime plant. The plant cost the government $1,519,000. The General Electric Co. and United States Rubber Co. are among bidders for the former Lowell, Mass., ordnance plant.

The Springfield steel foundry operated during the war by the Chapman Valve Mfg. Co., which cost the government $3,098,244 including machinery is on the market. Feelers are reported to have been made on the property, but the WAA refused to divulge details as yet.

L. S. Starrett Co., Athol, Mass., is not interested in government-owned plants, but has been granted permission to erect a plant addition for the manufacture of hand tools.

The Greenfield Tap & Die Corp., another small tool manufacturer, has purchased the air conditioned gage building operated by the company during the war. The plant cost the government more than $1,000,000, and the tool company bought it for $544,000.

Acute Copper Shortage Retards Reconversion

New York

• • • **An acute shortage of copper** is retarding the reconversion of the automotive, electrical and housing industries and this untoward delay in production is accelerating inflation, C. Donald Dallas, president of Revere Copper & Brass Inc., warned in a statement made here.

"Productive capacity of the copper industry in the United States at the present level of prices is about 65,000 tons a month whereas copper consumption currently requires about 120,000 tons a month of the red metal. There is only one source from which this crisis can be relieved and that is

PAGE *for* WIRE

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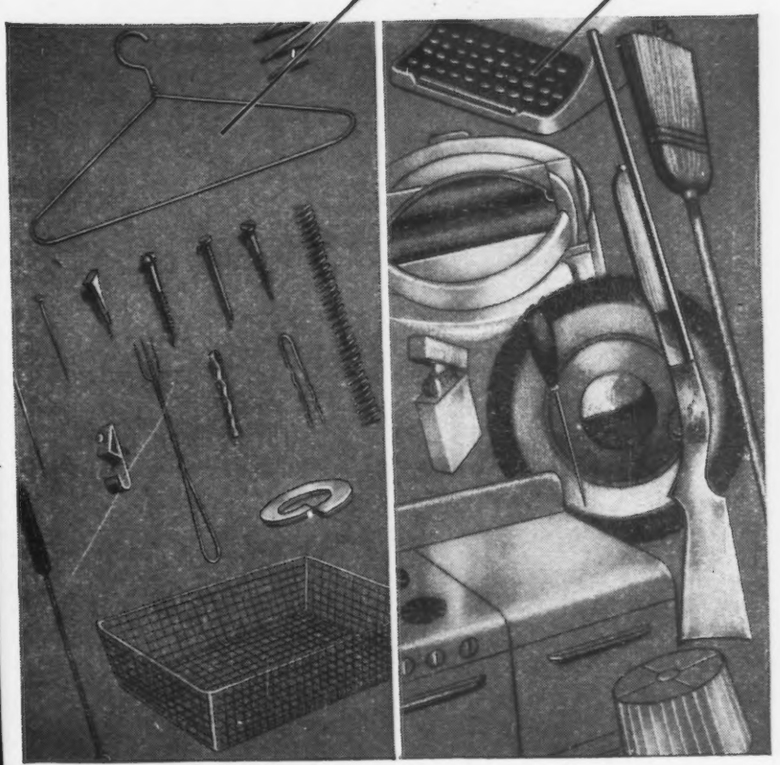

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the Metal Reserve Corp. It can make additional purchases from foreign sources and it can make available Metal Reserve stocks of approximately 300,000 tons of copper held in this country for conversion into shapes that can be used by such fabricators as Revere.

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To Complete 75,000th Car

New York

• • • **The 75,000th** locomotive to be built by the American Locomotive Co., will be completed at Schenectady, in September, said R. B. McColl, president.

Locomotive serial number 75,000 has been assigned to a new C000 hp diesel-electric mainline locomotive. American Locomotive built the first successful diesel-electric locomotive for United States railroads in 1925. This engine still sees daily service on the Central Railroad of New Jersey.

British Export Policy And Goals Explained

London

• • • **Herbert Morrison,** Lord President of the Council, in an address to the American Chamber of Commerce in London, said that Britain's export target was a 75 pct increase in volume and a heavier increase in value over normal prewar export figures. He told the meeting that by the end of this year Britain hopes to have 1,500,000 persons engaged in work allied to export, whereas the prewar total was less than 1,000,000. At the present time 1,265,000 workers are thus employed.

He said that British exports now are about equal in volume to the 1938 figure, and the government's present drive to build up overseas sales will not be halted until today's total is increased by at least 75 pct. Although normally the world's best customer, for the present Britain cannot import anything but basic necessities, and the recently approved loan to Britain "will make little difference" in this regard.

Gallup Polls

(CONTINUED FROM PAGE 101)

world organization, not in the hands of any one country.

(3) "The United States and other nations in this matter take a tremendous step forward by giving up some of the sovereignty exemplified by the veto power. A great pity Russia has refused so far to cooperate.

(4) "Sharing the information with the UN is essential to the preservation of peace."

The plan put forth by Mr. Baruch would have the United States give up making atom bombs, dispose of the ones now on hand, and turn over its information to an Atomic Development Authority, which would control all aspects of atomic energy development considered dangerous to world security.

The plan hinges upon the willingness of the Big Five—Britain, China, France, Russia, and the United States—to give up the one-power veto which now prevents penalties for any member of the Big Five unless all agree.

The American public-at-large has been very chary about sharing U. S. atomic energy secrets with other nations.

A majority oppose the idea of turning over control of American armed forces and weapons to a world parliament or congress, even though other countries do the same thing.

It would of course be unfair to make any direct comparison between this result and the results of this **Who's Who** poll, since the question asked of the public would go far beyond the Baruch proposals.

A majority of the voting public, another survey revealed, didn't like the idea of having representatives of other nations invited to watch the Bikini tests. A majority did not think the United States should give other nations a complete report on the outcome.

Also, a sizable majority feel that this country should not stop manufacturing the atomic bomb. The belief is, incidentally, widespread that other countries—Russia, England—are already turning out their own atom bombs.

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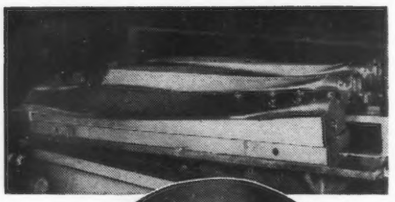

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London Economist

(CONTINUED FROM PAGE 107)

unless relief supplies continue. The coming harvest is expected to be poor. Experts in the Control Commission estimate that this year Austrian exports could pay for no more than a quarter of essential imports, including one half of its food imports, even at the present starvation level. The position next year is not expected to be much better. Here UNRRA has immensely important functions to fulfill apart from the actual provision of supplies; it can back up the Central Government's authority in collecting food within Austria for Vienna; it can purchase food from adjacent countries; and stimulate trade between the countries of Central Europe. Without UNRRA help, Vienna will have another year of starvation, and will need to push every possible export to buy food to the detriment of the long-term rehabilitation of the export industries. With UNRRA help, as a strong purchasing agency, Vienna might well be fed from European sources.

None of the UNRRA countries, except possibly Czechoslovakia, will have restored their economies sufficiently by the end of 1946 to finance their trade by loans, but they would do so more quickly, if there was an organization to purchase for relief purposes any European surpluses. If relief supplies cease, and there is no purchasing organization to promote inter-European trade, most of the UNRRA countries will be forced to borrow or to devote their meager exports to purchasing consumer goods, which will place an intolerable burden on their recovery. But if UNRRA were to operate for another year, consumer goods could be obtained as relief supplies, and recovery would be hastened. Moreover, the more the supplying countries are prepared to spend on relief now, the sooner there will be a commercial market for agricultural and industrial equipment. The U. S. and Canada would be well advised to continue to cast their bread—and farm machinery—on European waters.

Nor is it merely food relief which will collapse when UNRRA ends. The cumulative effects of 5 yr of war on European farming demand above all continuous and uninterrupted reconstruction in agriculture. If the work of agricultural rehabilitation can be energetically continued now and in the spring of 1947, it is possible that 1947 might see the end of the food shortage in Europe. Further, the knowledge of European conditions, which the UNRRA experts have gained in the field, is only now becoming valuable; but such expert knowledge and advice can only be digested and utilized in conjunction with the supplies. To interrupt UNRRA's work now will mean that the long-term objectives of the Hot Springs Conference and the proposed activities of the Food and Agriculture Organization (the FAO) may be equally frustrated.

But what is to continue UNRRA's work? Not the new Food Allocation Board nor the FAO. The functions of these bodies are to be respectively allocation and assessment of needs, and very long-term plans for agricultural improvement. It is obvious that this necessary work could be done better, if uniform standards of assessments of needs could be used. But the existence of better knowledge will be no advantage, if it cannot be implemented through lack of any organization to procure and ship supplies. Nor will long-term plans ever get under way if the short-term plans break down. If relief and reconstruction are to continue in 1947 some new organization must be created now, or the supplies will not be there.

There is much to be said for UNRRA itself continuing the work, under UN and in collaboration with the FAO. For UNRRA has the machinery, the experience, and good will. Above all, UNRRA has not become a political mechanism. If UNRRA ceases there will be no hope at all of keeping food relief or reconstruction out of politics. The alternative will be to abandon all attempt at distributing supplies in relation to needs and to direct them solely in accordance with the rival policies of the Great Powers. If that happens, the division of Europe into two zones will be complete, final and disastrous.

Russian Five Year Plan

(CONTINUED FROM PAGE 104)

into operation and the capacity of the existing iron ore mines at Tula and Lipetsk is to be increased.

(3) In the Urals, coal output is to be increased by 1950 to 6.05 million tons above the 1945 output, with a view to curtailing haulage from other regions.

(4) Western Siberia is to have its own ore supply and so curtail haulage from Magnitogorsk to the Stalin plant at Kuznetsk. This will involve the development of new mines with an annual capacity of over two million tons of ore. The Stalin works is second only to Magnitogorsk, and is to produce 2,750,000 tons of steel annually.

(5) The Far East is to have a coke and byproducts plant, and a blast furnace will be erected. The openhearth and rolling mill departments at the existing works are to be expanded. Prospecting and mining of coking coal is to be organized.

In the Ukrainian S. S. R., the Donetz Basin and Dnieper plants are to be rehabilitated, and the following are to be put into operation: 30 blast furnaces of aggregate capacity 9,900,000 tons; steel furnaces totaling 9,240,000 tons capacity; and 58 rolling mills of 7,150,000 tons annual capacity. In the Krivoi-Rog orefield, surveys are planned to locate deposits totaling 495 million tons iron ore and 82.5 million tons manganese ore. The Krivoi-Rog field accounted for 60 pct of prewar Soviet production.

In the Kazakh S. S. R., the plan provides for the completion of the existing steel mill and the erection of a new iron and steel plant. Commercial resources of iron ore totaling 110 million tons are to be prepared in the Atasui and Karkaralinsk field. Fifty-nine sites are to be prepared for sinking coal mines of total capacity 38.5 million tons (including 26.29 million tons of coking coal).

In the Georgian S. S. R., an iron and steel mill is to be erected. A coke cutput of 495,000 tons and a manganese ore output of 2,244,000 tons is planned.

From the foregoing details of the new plan it is clear that the

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tempo of the first three Five Year Plans is to be maintained, and that work on the elaboration of the present plan must have been going on for years. The resilience and recuperative powers of Soviet economy were amply demonstrated during the war, and an immense amount of rehabilitation work was actually done before the war ended.

What effect is the development of these plans likely to have on international trade in iron and steel? Before the war the U. S. S. R. was still an importer of steel products. These amount to nearly 440,000 tons in 1934 and 1935, and nearly 330,000 tons in 1936, the chief items being black sheets. She was only just beginning to export steel, although she was becoming a substantial exporter of pig iron, chiefly to Japan.

During the war the imports of steel from the U. S. increased considerably, rising to a peak level of 858,000 tons in 1944.

As regards future prospects, the new Five Year Plan shows clearly that the U. S. S. R.'s basic trend in economic policy will continue in the direction of industrial self sufficiency. In the long run she might become an appreciable exporter of steel, and although this likelihood is decreased by the heavy transport costs involved, it would not necessarily prevent exports to neighboring countries. It has been suggested that the U. S. S. R. will endeavor to reinforce her political position in eastern Europe by replacing Germany as a supplier of heavy industrial products to that area.

It has become a recurrent theme of Russian political discussions that the security of the Soviet Union would be threatened if neighboring countries—even those under "friendly governments"—were dependent on non-Russian sources for their supplies of capital goods. According to this theory it was Germany's position as a heavy goods exporter that gave her control over eastern Europe; and if the political cooperation between Russia and her neighbors is to be on a sound basis, it must be supplemented by close economic cooperation, with the Soviet Union holding the place formerly occupied by Germany.

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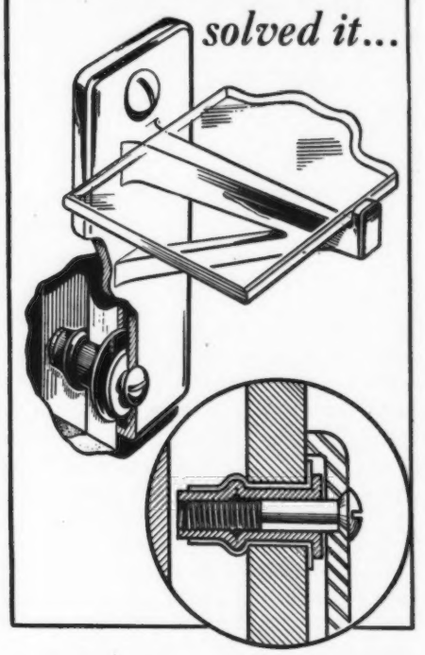

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